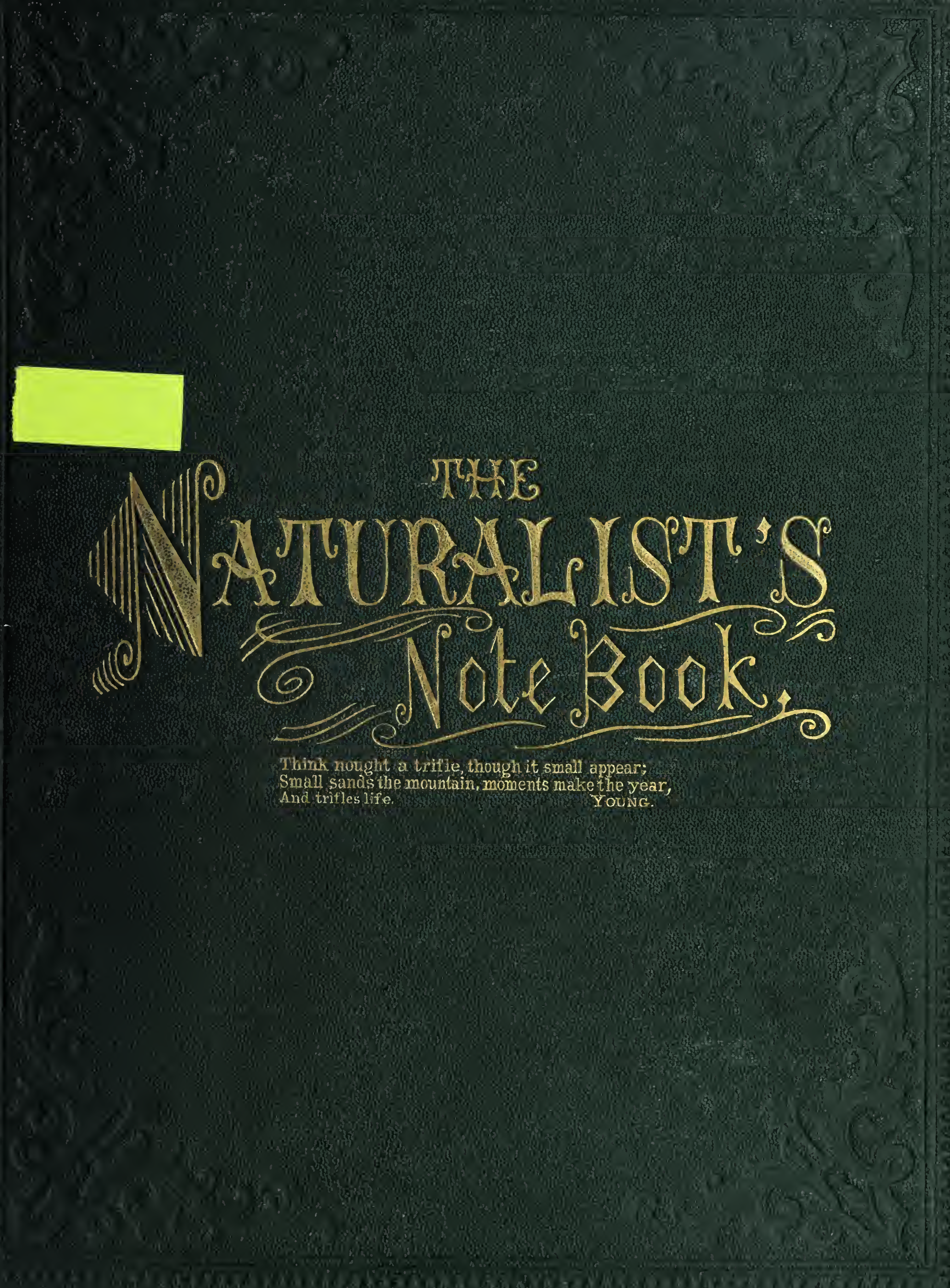

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A MONTHLY RECORD
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TOGETHER WITH

NOTICES OF NEW BOOKS, REPORTS OF THE MEETINGS OF
LEARNED SOCIETIES, ORIGINAL CORRESPONDENCE,
AND DESCRIPTIONS OF NEW INVENTIONS.

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Biology

PREFACE.

On the completion of this our First Volume we wish to return our thanks to those editors from whose papers, periodicals, and magazines we have largely extracted, amongst which we may mention "Once a Week," "Chambers's Journal," "The Field," "Land and Water," "Gardener's Chronicle," "The Popular Science Review," "Quarterly Journal of Science," "Zoologist," "Entomologist," and, not least, "The American Naturalist," (a publication we hope some day to see as popular in this country as we have no doubt it is in the land of its birth). Our thanks are also due to the following publishers—Messrs. Murray, Longmans & Co., Hardwick, Lovell Reeve, Churchill, Routledge, Sampson Low & Co., and Smith & Elder; together with many other gentlemen who have favoured us by permission to extract from their works.

We also beg to thank our numerous Subscribers who have supported us during the past year. Our endeavour has been to make the NATURALIST'S NOTE BOOK a complete record of new facts, theories, and anecdotes connected with all branches of Natural Science. If we have not succeeded entirely to our own and our readers' satisfaction, it has been because of the limited space at our command and the vast quantity of new matter always before us. Still we trust we have gathered together much information worthy of preservation, and which will always be found entertaining.

Of the future we have little to say. Our exertions will be continued to make the "Note Book" as interesting as possible, and to add in any way to its utility, by the addition of any new feature that will be likely to make it more acceptable to our readers.

January, 1868

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ILLINOIS.

THE
NATURALIST'S NOTE BOOK.

ADDRESS.

THE NATURALIST'S NOTE BOOK will be essentially what its title indicates—a Collection of Notes gathered from many sources on subjects of Natural History—not confined to one branch only, but extending to all, so that Astronomers, Botanists, Ethnologists, Geologists, Geographers, Meteorologists, Mineralogists, Zoologists, &c., will find matters of interest in its pages.

It is our intention to select facts interesting to every lover of Nature, not from periodicals only, but from all new works that appear during the month; and in gathering these *pearls* we shall candidly and fairly, in every instance, acknowledge their source. While thus much is due from us to those who supply us with information, it will at the same time enable those of our readers who may desire it to obtain further particulars upon any special subject in which they take an interest. Space will be reserved for original correspondence and remarks, and we shall, at all times, be glad to receive communications, interesting to the general body of our readers. It will be our endeavour also to answer to the best of our ability any inquiries under the head of *Queries*, which may be made to us.

The multiplicity of things in Nature worthy of our greatest admiration and constant study, unknown to the many, which are about us on every side, and the continued fresh revelations from day to day made known to us by science—Nature's handmaid—induce us to launch our little bark in the confident belief that our efforts to instruct and to amuse will be appreciated by the public. The aim of THE NATURALIST'S NOTE BOOK will be accomplished if it succeeds in advancing the growing desire for a further acquaintance with Nature's handiwork.

No. 1.—Vol. I.

HOW MOUNTAINS ARE MADE.

IN examining the outer crust of the earth, endeavouring to discover signs of movement, and the nature and causes of the movements which take place, suppose, that, after traversing the mountains and plains of Europe, you at length set off to look at the most extensive of all mountain ridges, which is that which extends almost from pole to pole along the western coasts of North and South America. You traverse the pampas, where the land is for the most part slightly undulated, so that in riding over it the horizon is constantly changing, and the eye is ever on the alert as objects appear or vanish in the distance. After passing San Luiz you traverse a series of undulations, which give to the country the appearance of a succession of huge ocean rollers pressing forward in parallel lines toward the mountains. You cannot fail to be struck with the peculiarity of the scene, They are a series of undulations upon a much greater undulation, for the land falls again before reaching the mountain. When yet two hundred miles east of that mountain-range you may catch sight of it, as its snow-covered peaks fling back the rays of the rising sun. You pass through the ruins of the city of Mendoza, which but five years ago was destroyed by a comparatively slight movement of the outer crust of the earth. At length you commence to mount the eastern slope of the huge mountain-ridge. You may glance eagerly from mountain to mountain—from valley to valley—districts of gravel, districts of sand, districts of earth, stratified masses, and unstratified masses. You may glance at all, vainly endeavouring by inductive steps to learn the process of their formation; all appears crude disorder and confusion. As the keen winds rush by perchance they laugh a derisive laugh, and the vast mountain-ranges—rugged, stern, and inhospitable—frown in silent majestic disdain. Here man is scorned. The rude mountains frown and the angry winds rage, as if threatening destruction to all who dare to venture here. But man shall triumph yet; for as you stand upon a narrow ridge which rises like a wall fourteen thousand feet above the sea, and on your right and left snow-covered peaks tower upwards nine or ten thousand feet higher, there stung by the failure of your efforts by the paths of induction, you boldly rush upon the dizzy-heights which are traversed by the dangerous paths of deduction. With a vigorous effort you fling imagination back through time, and let it place you in an age between which and the present countless ages have intervened. You then find that not only the mountains but the whole continent has fallen away from beneath you, and there now lies before you one vast expanse of water. The water is deep, but below there is a hard stratified ground, beneath which the interior of the earth is in a state of liquid heat, but gradually cooling, and as it cools the hardened surface is compelled to bend in graceful curves in order to suit the decreasing size of the globe. By this bending the water becomes of unequal depths, deepening in parts as it becomes shallow in other parts. At length immediately below you a ridge of dry land appears; this, then, is the birth of the South American Continent—it continues gradually to rise, throwing off the water to the east and west. There then lies the Pacific and there the Atlantic Ocean. The bending upwards and downwards in the same easy graceful curves continues as long as the surface remains sufficiently pliant; but at length becoming more hard and brittle as the strain still continues, it cracks with a tremendous crash, the rent extending north and south, almost from pole to pole. Up to this moment the surface has yielded gradually to the power of gravitation, offering great resistance. But once broken, this resistance is gone, and gravitation acting with unchecked power, crushes and grinds the broken edges together with a force scarcely conceivable by the mind of man. Enormous masses of what had once been horizontal strata are now perpendicular or even reversed. The smashing and grinding of the broken edges by the overwhelming lateral pressure caused by gravitation, leaves scarcely a trace of the former stratified order, but leaves mass piled on mass in vast confusion, forming this huge mountain range along the course of the crack. And more than this, the outer crust of the earth had hitherto been in a great measure self-supporting, its weight resting upon itself laterally in all parts, so that the interior parts of the earth were in the same measure relieved from the weight of its inward pressure. That is, inward pressure had been changed to lateral pressure in proportion as the hardening surface of the earth offered increased resistance to the power of gravitation. But when the hardening surface of the earth becoming more brittle had bent upwards as far it could without breaking, it at length breaks along the top of the ridge, and in proportion with the loss of lateral support thus caused, the weight of the adjacent parts of the surface press inwards, and the inner parts of the earth being in a state of liquid heat, the increased weight pressing upon the fluid part forces the fluid matter upwards through the fissures in the crack, and thus in some places mountain ranges of unstratified rock are formed as the fluid hardens on the surface; but here the accumulation of broken masses of stratified matter is so enormous that this part of the range seems to consist of nothing else. The stratified surface to the east of the crack has here overlapped that to the west. So that on the west the Pacific ocean rolls against the disjointed masses that have been piled up abreast of it, whereas on the east, the elevated strata slopes away gradually to the Atlantic Ocean. That slope is itself undulated by pressure, but those undulations are probably precedent to the occurrence of the crack which led to the piling up of the Andes, most, if not all, subsequent readjustments of the surface having been arranged by movements along the still uniformly placed edges of the crack. The sudden movements in this neighbourhood even now cause at times a shock or earthquake sufficient to overwhelm cities. In these movements also, either by direct pressure of the surface downwards, or oftener probably by water or other matter being suddenly brought into contact with intense heat, matter from below the stratified surface is, in a state of liquid heat, forced upwards through openings in the crack, thus forming, as the matter hardens on the surface, those high volcanic peaks which are here so numerous. Or in other places the same expansion, not having sufficient force to burst through the surface, simply raises it in the form of an evenly rounded hill.—*The Elements, by William Leighton Jordan.* Vol. I.—Longman.

IVORY.

THE elephant is a tolerably large animal, but he is of little use to mankind unless he deposits his tusks in some convenient place where an enterprising Yankee or a roving Englishman may find them. It is the tusks of this lively beast, who generally travels with a circus in this country, that supply the ivory in commerce. The hippopotamus, the walrus, the narwhal, and a few other animals, make annual contributions to the ivory market, but the quality of the article they furnish is inferior to that supplied by his royal highness the elephant. This is unfortunate for the elephant, for the superior quality of the ivory he carries in his mouth tempts greedy hunters to slay him, that they may thereby derive much profit. Consequently, where elephants do most abound, there dwells also the ivory-hunter. The western coast of Africa is well supplied with elephants, and their tusks yield the finest and best quality of ivory. Other portions of Africa abound in elephants, but their ivory is not so transparent as that found in the west coast elephants. The principal supply of ivory is derived from Bombay, the Cape of Good Hope, Calcutta, Singapore, and other East India ports.

The tusks vary in size, weighing from six ounces to one hundred and sixty pounds. A German writer mentions having seen them weighing one hundred and eighty-six pounds, and ten feet in length. The number of elephants annually killed for their ivory alone can scarcely be estimated, but some idea may be formed when it is known that the slaughter of 22,000 elephants a year is required to supply the cutlery establishments of Sheffield with handles for the knives and other cutlery made there. Dealers in ivory express considerable alarm lest the supply of elephants should run short in a few years, and so throw them out of business. African tusks are the most transparent and the freest from cracks. The straightest tusks are considered the best; they are covered with a thin rind, which has to be removed previous to being worked, and are usually hollow for a portion of their length, the cavity sometimes extending half way to their middle. The tusks are imported in their full proportions by the manufacturers or workers in ivory.

Ivory is susceptible of receiving a very high polish, and is easily worked with proper tools in the hands of skilful workmen. It is principally used in the manufacture of handles for cutlery, billiard balls, gambling checks, chessmen, napkin-rings, and ornaments for ladies' wear. Some sets of chessmen are most elegantly carved by Chinese workmen, who are famous for their skill and dexterity in producing fancy articles from this material. In this country the principal use found for ivory is in the making of billiard balls. The immense popularity of this game in America renders it almost impossible to keep up the supply of balls. Ivory is apt to shrink considerably, and it is necessary to cut out the balls in the rough and hang them up to season for a long time before they can be turned exactly round and true as required. When the ivory is properly seasoned, a section is put in an ordinary turning-lathe, when, with a proper tool, a skilful workman speedily turns it down to the required size. He commences in the centre of the ball, and passes his tool rapidly to the pole, throwing off a complete ring. This is repeated until the ball is perfectly accurate in all its proportions. Other articles are made, either in the turning-lathe or with tools similar to those used by carvers of wood. Designs of almost any kind can be carved in ivory, but there are but few workmen in this country capable of producing the finest work. Indeed, the Chinese may be said to monopolise the fine work in ivory carving, and specimens of their skill are often seen in the handles of ladies' fans. Labour being so cheap with them, the artists of this and other countries are unable to compete with them. The writer of this once "took a chance" in a raffle for a set of chessmen carved in China, each piece being of most exquisite workmanship. The set was valued at 500 dollars, but could not have been done in this country for five times that sum. Napkin-rings, next to billiard balls, are the most saleable articles manufactured from ivory. They are turned in an ordinary lathe, and some of them are subsequently ornamented with carved work done by hand. The process of colouring these and other articles is a secret of the trade which is carefully guarded. They are subjected to the action of chemical dyes until the desired colour is produced. A French gentleman in America has invented an ivory dye which is said to be the best and most lasting in use. He is very ready to tell how to use it, but does not mention the ingredients of which it is made. As he has the article for sale, he cannot be blamed for his reticence. There is a great demand for gamblers' checks, also. These are simply little round or octagonal bits of ivory, about the size of a silver dollar, of various colours with figures cut upon them. In a gambling saloon these represent dollars, and are issued by the "bank" on payment of greenbacks.

There is no waste of any account in the ivory manufactory. All the scraps and shavings are put to some use. Pianoforte keys, penknife handles, sleeve-buttons, and numerous other small articles are made from the scraps, and a very good article of jelly is made from the dust and shavings. From the unclean refuse an article known as ivory black is made, which enters into the composition of ink used by copper-plate printers. Ivory can be cut into exceedingly thin sheets, and is frequently used for veneering purposes. To do this a portion of a tusk is put into a lathe, and a thin, continuous sheet turned off with a very delicate tool. It is then placed in a chemical solution to destroy its earthy substance, after which it will retain the form in which it has been placed. At the London Exhibition of 1851, a piece of ivory veneering, one foot wide and forty feet long, was exhibited in the United States' Department.

Ivory is used to a considerable extent in the taking of portraits, and was formerly used to a great degree by painters and sculptors. Many mathematical and other instruments, and a great variety of toys and ornaments, are made from this material. For some articles—billiard balls, for instance—made from ivory, no substitute has been found. A large dealer in billiard stock has offered a reward of several hundred dollars to any person who will produce a substance from which billiard balls can be made as durable and cheaper than ivory ones. As yet no one has responded.—*Building News*, Dec. 14.

THE BIRDS OF POLYNESIA.

THE most rare and, when in full plumage, one of the most graceful of Samoan birds is the Dodo-like Manumea (*Didunculus Strigirastis*). Its plumage is a brilliant dark blue, with just a tinge of brown on the edge of a feather here and there ; its size about that of a common house pigeon, its legs pink, its bill dark, with a tinge of pink. Its habits are nocturnal, and with its diminutive wings it travels by long hops or jumps. When at rest it perches on the low branches of the bushes, to which circumstance the natives attribute its extinction, as it is so easily caught by the wild cats and monster rats which infest the wood.

The Punæ (or springer-up) is another remarkable bird, which is now also nearly extinct from the same cause. The natives state that it burrows in the ground, feeds on grubs, worms, and insects, runs very fast, and, when first starting from its burrow, makes a long spring upwards from the ground, but having very small wings it cannot fly.

The Manu-ma (or bashful bird, *Ptilonopus Mariæ*) is a very beautiful and resplendent dove, closely allied to the Manu-tagi (tangi) or crying bird (*Ptilonopus fasciatus*). The first has the crown of the head a bright purple ; back, wings, and tail, a pale green ; breast, white, purple, and yellow, intermingled ; and the under part of the body a very pale grey or stone colour ; under the tail is a little tuft of yellow feathers fading into the pale green of the tail. The second has the head a very pale crimson ; back, wings, and tail a light green ; breast and lower part of the body a pale yellow intermixed with pale green. Both feed on berries, and are very shy in the bush, but soon become quite domesticated when caught, and, like the pigeon, eat freely from the hand. They are also trained to fly round the Maloe, with a long string, like the pigeon, and, at the call, to return and perch on the finger. Another beautiful dove is the Manu-lua, or double bird, not unlike the Manu-tagi in plumage, and similar in habits. The Tu, or Tu-aimeo, are very pretty little birds of the dove family, with plumage of a dark chocolate brown, which varies in its tinges according to the light thrown upon it, and a yellow bill ; they hop and fly about very actively on the lower branches of the small trees, and run on the ground very swiftly. The Lulu is a species of owl (*Strix delicatula*), is very common, and preying as it does on the chickens, even at the house door, it is destroyed whenever the opportunity offers.

The Manu-ao, or morning bird, is perhaps the best songster the Samoans have ; it possesses a very melodious voice, ranging from the lively to the plaintive in one breath, and is always heard in the early dawn. Its plumage is something between a black and a brown, with a tinge of blue, and is about the size of our nightingale. The Fuia reminds us of our blackbird in colour and size, but its song is inferior, though I think it ranks next to the Manu-ao among the few song-birds of the Samoa. The Tutu-malili is also like our blackbird, but without its song. The Tiotali (*Dacelo albifrous*) very much resembles our kingfisher in appearance, and feeds on grubs and worms, and has no song. The Sega is a beautiful little parroquet, with a deep green plumage and red breast. It sucks the honey found in the blossoms of the cocoa nut and the gatae (ngatea). The little boys climb the cocoa-nut trees, and, as it feeds, slips a noose made of the fibre of the cocoa-nut husk, over its head ; but, unlike the parroquet of Fiji, it does not live many weeks when caught. The Iao, another honey eater, with a light brown plumage, is an active, saucy little bird, whose chief delight is to join with its mates to tease and worry the Oleoa, a timid, stupid bird, very much like our cuckoo. The Tolai or Tolai-ula is a delicate little bird, with a bright black plumage, a brilliant scarlet breast, and long black bill and legs. The Pea-pea is a bold little swallow, always playing about one's head in the evenings, feeding on gnats and other insects. The Sega-mauu is a handsome bird, with a plumage of bright green, feeds on seeds, and has no song.

The Tuli is a species of plover, found at low tide seeking its food along the sandy beaches, and is very good eating. Another seashore bird is the Matuu, or crane, of which there are three varieties, distinguished as they stalk about the sandy beaches, or over the mud flats, by their plumage—lead-colour, pure white, and speckled —the first is the most common. The Manu-lii is a very handsome bird, with a brilliant blue plumage, a bright red cap on the head, red bill, and long red legs, and makes a very hideous screeching noise. It lives and feeds in the marshes and swamps, where the natives plant the water-taro, which it destroys by scraping up the young roots. It is readily domesticated, and learns to follow its master like a dog. The Soloa is a species of teal, is found in goodly numbers about the taro swamps just outside the villages as well as up the valleys, and about the banks of the rivers.—*Polynesian Reminiscences, by W. T. Pritchard.* Chapman and Hall.

THE NOVEMBER METEORIC SHOWER.

THE fiery shower foretold by the science of America and Europe for the night of the 13th-14th November, 1866, was seen in full splendour. From about eleven o'clock occasional meteors might be seen gliding along the sky, from east to west, but these were only the *avant-couriers* of the great legion that followed at a later hour.

The numbers increased after twelve o'clock with great rapidity. From Paddington Green, a fairly open position, 207 meteors were counted between 12 and 12.30, and of these the greater number fell after 12.20. The next hundred was counted during the six minutes that succeeded the half-hour. Soon after this it became impossible for two people to count the whole that were visible from this station; and doubtless from positions with a purer atmosphere, and a wider horizon, the spectacle must have been one of surpassing splendour. Indeed, from a window at Highgate, looking N.N.E., but with a circumscribed view, an observer counted 100 meteors in the four minutes between 12.32 and 12.36, and no less than 200 in the two minutes between 12.57 and 12.59.

As the constellation Leo rose over the houses north of Paddington Green and cleared itself of haze, the divergence of the meteor-paths from a point within it became obvious, not merely in the directions of the streams that shot from or through the zenith, but in those that left their phosphorescent-seeming trails in the sky towards every point of the compass.

Sometimes these rocket-like lines of light would glide out like sparks flying from an incandescent mass of iron under the blows of a Titanic hammer, but with the distinctive features, first, of those lingering lines of illuminated haze in their track, and secondly of their rarely appearing as if they originated in the region of the sky from which their courses evidently diverged.

Sometimes the meteor was orange and almost red in its colour, whereas the luminous trail seemed almost always, probably by contrast with the surrounding light, of a bluish hue. In one splendid instance the trail, after having nearly disappeared, together with the rocket-head that had produced it, became again lit up and visible coincidently with a sort of resuscitation of brightness in the body of the meteor. Now and then a little illuminated puffball would appear in the middle of the constellation Leo, generally more or less elongated or elliptic in form, as it seemed to be more or less distant, and at the same time convergent from an imaginary point that seemed about thirty degrees S. by E. of the star γ Leonis; and one as near as could be estimated to such a point, was simply a star that waxed, and waned, and disappeared as one looked at it.

Sometimes a minute point of light, like a firefly, would dart with an angular jerking motion and zigzag course hither and thither, but still as if away from Leo.

Only about three meteors were seen during an hour and a half to take a direction manifestly opposed to that of these diverging multitudes. The meteors which shot towards the western horizon seemed more brilliant and larger in their courses than those which dropped into the eastern; indeed, very few seemed even to reach the roofs of the houses from behind which Leo had arisen. This was possibly only an effect of perspective, or it may have arisen from the curtailment of the view. As regards the long lines of light that lingered in the paths of the meteors it seemed that generally they were more dense and brightest towards the middle of the visible path of the meteor, while the meteor itself seemed brightest just before its extinction, an effect possibly due to an obscuration in the middle of its course by matter thrown off from it. The meteors seemed also to lose velocity as they went, but this might have been the result of perspective in those passing through the zenith.

One singular feature in these celestial fireworks was the rapidity with which the *maximum* of frequency came on and went off again. About two o'clock the meteors seemed to have become as scarce as they were at twelve, though they continued in smaller numbers till the verge of daybreak.

From half-past twelve or a quarter to one, until about a quarter-past or half-past one the heavens seemed veritably alive with stars rushing in many parts of the sky, in groups of two or three together, or in immediate succession on each other, seeming as though racing over the blue vault, except that their courses so rapidly diverged.

The cloudless beauty of the night near London was a happy circumstance, on which we may congratulate every "watcher of the skies," not only as allowing the forecasts of the astronomers to be thus signally and splendidly verified, but still more as having, we trust, enabled them to take such a store of facts regarding the nature of the light, and of the motion of meteors, and so many simultaneous observations of them in different parts of our islands, as may lead to some accurate knowledge of their laws and their nature, and add one more chapter to the sublime volume of astronomical physics.—*Times, Nov.* 15*th*, 1866.

TO THE EDITOR OF THE TIMES.

SIR,—The predicted shower of meteors has been witnessed here during the past night under very favourable atmospheric circumstances. In addition to Mr. Wiss and myself, our observing force included M. du Chaillu (who kindly volunteered his assistance on this occasion) and Dr. Hampshire. From midnight to one o'clock a.m., Greenwich time, 1,120 meteors were noted, the number gradually increasing. From 1 a.m. to

1h. 7m. 5s. no less than 514 were counted, and we were conscious of having missed very many, owing to the rapidity of their succession. At the latter moment there was a rather sudden increase to an extent which rendered it impossible to count the number, but after 1.20 a decline became perceptible. The *maximum* was judged to have taken place about 1.10, and at this time the appearance of the whole heavens was very beautiful, not to say magnificent. Beyond their immense number, however, the meteors were not particularly remarkable, either as regard brilliancy or the persistence of the trains, few of which were visible more than three seconds; indeed, M. du Chaillu observed that in these respects the meteors fell far short of those of the April period, which he had witnessed under a fine sky in equatorial Africa. From 1.52 to 2.9 300 were registered; from 3.9 to 3.24, 100; from 4.42 to 5 the number seen was 12, and these mostly faint; and from 5.45 to 6 only five were counted.

No person acquainted with the constellations, who carefully watched the display of last night, could have any doubt as to the accuracy of the astronomical theory relative to these bodies. The radiant in Leo was most strikingly manifested; while the meteors in the opposite quarter of the sky traversed arcs of many degrees; in the vicinity of the diverging point they shone out for a few seconds without appreciable motion, and might have been momentarily mistaken for stars by any one to whom the configuration of the heavens in that direction was not familiar.

Several very vivid flashes of lightning were remarked during the night. The last, at 3.54, was particularly brilliant, of a deep orange colour, and apparently emanated below the radiant in Leo. The horizon in that quarter was occupied by a pale glow, resembling what has often been remarked during exhibitions of the aurora borealis.

A telegram from Mr. Bishop, who watched the phenomenon during the night at Weymouth, mentions one a.m. as the time of *maximum*, which is in accordance with the determination made here.

I am, Sir, your obedient servant,
J. R. HIND.

Mr. Bishop's Observatory, Twickenham,
November 14th.

THE BAOBAB TREE.

THE Baobab (*Adansonia digitata*) is a tree of tropical Africa, which has been transplanted by man into Asia and America. It may be ranged among the marvels of nature. Its trunk does not exceed fifteen or eighteen feet in height, but its girth is enormous, attaining, as it sometimes does, the circumference of thirty to forty feet. This trunk separates at the summit into branches fifty to sixty feet long, which bend towards the earth at their extremities. The trunk being short, and the branches thus curving towards the earth, it follows that the baobab presents at a distance the appearance of a dome, or rather a ball of verdure over a circuit of a hundred and sixty feet. Adanson concluded, from the observations he made, and from his calculations upon their growth, that some of the specimens which he studied could not have been less than 6,000 years old; but it is the general opinion of botanists that this estimate was enormously overrated. This colossal vegetable was first observed by Adanson on the Senegal, and after him the genus was named Adansonia. The baobabs have since been discovered in the Soudan and Darfour, and in Abyssinia.

The bark and leaves of the tree possess considerable emollient properties, of which the natives of Senegal take advantage. Its flowers are proportionate to its gigantic trunk; they reach the length of four and a half and five inches, their breadth being from seven to eight. The fruit, called by the French settlers in the Senegal *monkey's bread*, is an ovoid capsule pointed at one of its extremities, and from twelve to twenty inches long, by six to seven broad; that is, the fruit is about the size of a man's head. It encloses in its interior from ten to forty cells, containing several kidney-shape seeds, surrounded by mucilaginous pulp. The natives make daily use of the dried leaves of the baobab. They mix them with their food for the purpose of reducing excess of perspiration, and modifying the ardour of their fiery climate. The fruit is eatable, its flesh is sweet, and of an agreeable flavour; the juice, when extracted and mixed with sugar, forms a beverage very useful in the putrid and pestilential fevers of the country. The fruit is transported into the eastern and southern parts of Africa, and the Arabs pass it on into the countries round Morocco, whence it finds its way into Egypt. The negroes take part of the damaged fruit and the ligneous bark, burn them for the sake of the ashes, from which they manufacture soap by means of palm oil. They make a still more singular use of the trunk of the baobab. They expose upon it the bodies of those they consider unworthy of the honour of sepulture. They select the trunk of some baobab already attacked and hollowed out by insects or fungi; they increase the cavity, and make in the trunk a kind of chamber, in which they suspend the body. This done, they close up the entrance of this natural tomb with a plank. The body becomes perfectly dry in the interior of this cavity, and becomes a perfect mummy without further preparation. This kind of sepulture is especially reserved for the *Guerrots*. The Guerrots are the musicians and poets who in the tombs of negro kings preside at all fetes and dances. During their life this kind of talent gives them influence and makes them respected by other negroes, who look upon them as sorcerers, and honour them under the title; but after death this respect is succeeded by a kind of honour. These superstitious and infantile people imagine that if they consigned the body of one of these sorcerers to the earth, as they would the bodies of other men, that they would draw upon themselves the celestial malediction. Hence the monstrous baobab serves as the resting place of the Guerrot. There is a strange poetry in this custom of a barbarous people, which leads them to bury their poets between heaven and earth in the side of the vegetable king.—*The Vegetable World, by Louis Figuier.* Chapman and Hall.

GEOMETRICAL FORMS IN ANIMAL LIFE.

We may observe that while certain plants and flowers suggest by their form of construction various crystalline forms, certain animals (insects especially) work in similar conformity with geometrical principles. The cells of bees, for instance, are a notable exercise in this way; they are so built as to present a double front, although not set precisely end to end, their bases consisting of three sides, and the upper side of one base coinciding with the lower division of its opposite base. The other two of each reciprocally corresponding, now with a view to the least possible expenditure of wax, it is required that those six sides should be inclined at angles which were determined by a celebrated mathematician to be almost inappreciably less than the bees had made them. On further investigation, however, it appeared that several small quantities had been neglected in the analysis, which, on being taken into account, proved the architecture of those accomplished insects to be unimpeachable.

The web of the spider may be regarded as another example of that geometrical government which is of such extensive operation throughout the universe. The artist begins his work like a skilful engineer, fixing the threads which form the basis of his operations with the utmost mechanical skill; and what deserves notice is that all such arrangements necessarily depend upon the form and conditions of the locality he selects. There is always a logical reason to be rendered for the attachment of this line and of that. The state of his premises require a considerable length in a third line, and as he is aware (or seems to be so) that the curve named the catenary might be incidental to it, he secures its due tension by joining to it a fourth line midway between its extremities, which he fixes to its right support in a manner that is truly knowing. In the structure of the web he lays his threads parallel to one another, and carries them round the circle, fastening them as he goes without deflecting from his ideal a hair's breadth. He must know, one would think, that what he has been so ingeniously contriving is neither more nor less than a snare to catch flies, though he might possibly not go to the length of reflecting that of all the artifices that could be ordained for such a purpose there never was anything under the wide heaven equal to it.

The star fish, which belongs to the highest class of Radiata, is extended into five triangular rays, disposed with mathematical accuracy, the base of each triangle being opposite to the angle formed by two others. In the pentagon of the centre, moreover, a circle is inscribed, from which five bundles of fibres are given off, one to each ray. This is the star fish's nervous system, and the manner in which those nerves originate cannot fail to remind you of the setting of stamens in a flower. But there is a display of higher geometry still in very humble life—in that, namely, of the shell tribes, many of which are developed into whorls and spirals which might try the skill of an analyst to investigate.

It is very singular that the surfaces which are presented by the eye of the bee are all hexagonal, like its cell. This construction, however, is not confined to the eyes of bees, but is found in very many other of the articulates. In the Mordella beetle 25,000 have been counted, in a butterfly 17,000, and in a dragon fly 12,500.—*The Key to the Universe.* Chapman and Hall.

LEOPARDS.

In common with other spotted cats, the leopard is an animal which varies a good deal in its markings, and also in depth of hue. Much diversity is observed in examples from the same neighbourhood. In general, those from temperate and cold countries run very pale, and have longer fur. Such are the leopards from Persia and Afghanistan, and from the higher Himalaya. We never see black or blackish (melanous or melanoid) individuals from those countries. In Southern India and Burmah, and over the Malayan region generally, wherever this animal extends its range, it is commonly of a deep ground colour, and in Bengal and Central India, both pale and deeply coloured individuals are common, as also generally over Africa. There is no constant difference whatever between Asiatic and African leopards, however individuals may vary, although a distinction between the so-called panther and the leopard has often been sought to be made out; but this animal attains an unusual size in Barbary, or at least in Morocco, and becomes formidable in proportion to its magnitude. A huge Morocco leopard may now be seen in the Zoological Gardens.

We do not remember seeing a black leopard from any part of Africa, but have seen many black or blackish individuals from Central India, Malabar, Assam, the Tennasserim provinces, Malacca, and Java ; and we once saw a litter of four cubs, three of which were of the usual colouring, and the fourth deep black. Intensely black individuals sometimes occur, in which the usual black spots can only be seen at particular angles of reflection ; but more commonly the ground hue is more or less brownish, and the spots are tolerably conspicuous.

Such animals are commonly designated as black tigers, but a genuine black tiger we never saw, nor the skin of one. In M. d'Almeida's "Life in Java," however, we find a notice which should apply to a real black tiger. This author remarks, "We stopped to see a couple of fine tigers in two separate cages, or inclosures made of palisades fixed close together. One of these formidable animals was what they call the *macham itam*, or black tiger, which has a very dark, silky coat, the black streaks of which are less distinct than those of the common kind. Both of these wild beasts had been entrapped in one of the neighbouring forests, and, with the wild buffalo, were to form the chief amusement at the coming election of his excellency the young regent, to whom we had been introduced. The natives are very fond of the sports in which these dangerous animals are introduced ; and it is the custom of the chiefs to preserve tigers, &c., for occasions of rejoicing."

In this notice the *stripes* of the skin are distinctly mentioned ; but we have often been disappointed upon inspection of animals which had been as positively denominated black tigers and not leopards ; though, of course, there is no reason why a black tiger should not also sometimes occur. The Javanese tiger is less brightly coloured than that of Continental Asia, and the fluvous colour suffuses the white of its underparts, which therefore do not contrast so brightly as in tigers from the mainland.—*Land and Water*, Dec. 1.

THE HOT SALT SPRINGS OF TIBERIAS.

THESE springs, which have been noticed from a very early period, are about a mile from the city. Josephus often mentions them under the names of Emmaus and Ammaus, probably a Greek form of the Hebrew *Hammath ; i.e.* warm baths. The Arabic word Hammam, by which they are now generally known, is a corruption of the Hebrew. Seetzen thinks that if these springs were in Europe, they would form one of the most attractive bathing places of the world. Burckhardt found a bathing-house erected over the one nearest to the city, and furnished with two apartments. The spring which is used is the largest of the four hot ones, and the supply of water is great enough to turn the wheels of mills ! The three other hot springs, or really four, if one counts two smaller ones lying side by side, are two hundred steps farther south, and the most southern one, which is so shallow that the hand can scarcely be dipped into it, is the hottest of all. These baths are much resorted to by persons afflicted with rheumatism, scurvy, and leprosy, from many parts of Palestine and Syria.

Von Schubert found the hot springs to have a temperature of 48 deg. Reaum., and to contain salt and a solution of iron. He compares the waters with those of Carlsbad : at the bottom he observed sulphur and lime globules, coloured red with the oxide of iron. Not merely the warmth of the springs themselves seemed to be favourable to the persons afflicted with palsy, who use their waters, but the warmth of the nights there also seems beneficial. There prevails around Tiberias a true hothouse climate, and the palm flourishes there as well as in Akaba and Alexandria. On the north side of the city of Tiberias also, at Szermadin, there is a warm brook of about 20 deg. Reaum., which rushes forth from a cavernous outlet in the rock, and whose waters taste of salt and iron. Its banks are abundantly overshadowed with the beautiful evergreen oleander, with its rose-like blossoms, a true delight to the eyes. Still further to the north are found copious warm springs issuing from the basalt rocks, and forming brooks of considerable size, that dash down the steep declivity leading to the sea. The great number of these springs, and the abundant supplies of water which issues from them in a region very scantily supplied with springs of fresh water, hint very strongly at volcanic activities once at work there, to which probably they owe their existence.—*Comparative Geography of Palestine, by C. Ritter.* T. & T. Clark.

THE SAND-MARTIN AS AN ENGINEER.

THE *Quarterly Review*, in an interesting article on the building powers of birds and insects, says —"Among birds the little sand-martin, with its slender feet and minute bill, seems at first sight but ill fitted for engineering operations. "Few would suppose," as Mr. Wood remarks, "after contemplating its tiny bill that it was capable of boring tunnels into tolerably hard sandstone.

Such, however, is the case, for the sand-martin is familiarly known to drive its tunnels into sandstone that is hard enough to destroy all the edge of a knife." The mode in which this little miner excavates its gallery, at the end of which it places his nest, has been carefully observed and well described by Mr. Rennie, in his "Insect Architecture," whose name is well known to every naturalist as an admirable observer of the habits of animals. "The bird works with its bill shut. This fact our readers may verify by observing their operations early in the morning through an opera-glass, when they begin in the spring to form their excavations. In this way we have seen one of these birds cling with its sharp claws to the face of a sandbank, and peg in its bill as a miner would do its pickaxe, till it had loosened a considerable portion of the hard sand, and tumbled it down amongst the rubbish below. In this preliminary operation it never makes use of its claws for digging; indeed, it is impossible it could, for they are indispensable in maintaining its position, at least when it is beginning its hole. We have further remarked that some of these martin's holes are nearly as circular as if they had been planned out with a pair of compasses, while others are more irregular in form; but this seems to depend more on the sand crumbling away than upon any deficiency in the original workmanship. The bird, in fact, always uses its own body to determine the proportions of the gallery, the part from the thigh to the head forming the radius of the circle. It does not trace this out as we should do by fixing a point for the centre around which to draw the circumference; on the contrary, it perches on the circumference with its claws, and works with its bill from the centre outwards; and hence it is that in the numerous excavations recently commenced which we have examined we have uniformly found the termination funnel-shaped, the centre being always more scooped out than the circumference. The bird consequently assumes all positions while at work in the interior, hanging from the roof of the gallery with its back downwards as often as standing on the floor. We have more than once, indeed, seen a bank-martin wheeling slowly round in this manner on the face of a sandbank, when it was just breaking ground to begin its gallery. All the galleries are found to be more or less tortuous to their termination, which is at the depth of from two to three feet, where a bed of loose hay and a few of the smallest breast feathers of geese, ducks, or fowls is spread with little art for the reception of the eggs. It may not be unimportant to remark also that it always scrapes out with its feet the sand detached by the bill; but so carefully is this performed that it never scratches up the unmined sand, or disturbs the plane of the floor, which rather slopes upwards, and of course the lodgment of rain is thereby prevented.

HOW TO MAKE RUBIES AND OTHER PRECIOUS STONES.

In 1814, Davy first showed the elementary nature of the diamond by burning it in oxygen, and subsequent analyses have made known the very ordinary materials which compose most other precious stones. Thus rubies and sapphires are nearly pure alumina, with a little oxide of chromium, to which they owe their colour; garnet consists of silica, oxide of iron, and alumina; emeralds of silica, alumina, and glucina, *et cetera*; and similar ordinary constituents form most gems.

But, unfortunately, the mere knowledge of the composition of these gems is only a small step towards their production. The real difficulty is to cause their elements to unite and assume the crystalline form and properties to which they owe their beauty and reputation, and to effect this with substances that do not admit of the application of the usual means of producing crystallisation, appears at first sight an impossibility, since neither the gems nor the materials of which they are composed are soluble in any liquid, or are capable of being volatilised. But the circumstance of their being found native shows the possibility of forming them by natural means, for, to quote Leibnitz while advocating this very subject, "Nature is only art on a grand scale." In the laboratory of the earth long continued high temperature with steam and other vapours at enormous pressure are probably very frequent conditions; and, indeed, these internal phenomena make themselves apparent to us at the surface by volcanic eruptions, boiling springs, &c., facts whose frequent occurrence we are somewhat apt to disregard. But while these internal conditions doubtless occur on the grandest scale, there is no reason for supposing their essential effects cannot be imitated by means at our command. The success already achieved in the attempt to obtain natural productions by artificial means not only possesses an intrinsic reward, but has also thrown much light on the operations of Nature herself.

Seventeen years ago Ebelman perceived that the high and long-continued heat of the porcelain kilns of Sèvres offered probably the necessary conditions for the production of some natural minerals, and proceeded to make a series of most ingenious and successful experiments with this view. He put together certain portions of alumina, magnesia, and a little colouring oxide, with a considerable amount of boracic acid, and exposed the whole mixture to the long-continued heat of the furnace. The acid melted and dissolved materials, and at length in part evaporated. When the mixture was finally examined, Ebelman found in place of the original substances—perfect crystals of spinelle ruby.

By proceeding on this principle, and varying the materials and solvent, he succeeded in producing true rubies and emeralds of perfect form, which it was impossible to distinguish from the natural ones. Size was the only advantage which the workmanship of nature had over that of art; some of Ebelman's stones, however, had crystalline facets of an eighth of an inch across.

These were the first successes in the artificial production of minerals, but more lately many other methods have been discovered, which are of wider and more ready application. These processes are of the highest interest to the geologist, since they serve to explain the natural formation and occurrence of many minerals. But we will continue our original alchemical view of the subject, and disregarding the methods by which the meaner minerals have been formed, consider only the case of the precious stones. Malachite was formed by Senarmont by acting upon chalk with a solution of chloride of copper at a high temperature and pressure. Perfect topazes have been made by passing the gaseous fluoride of silicon over red-hot alumina. But perhaps the most prolific method yet discovered is that which we owe to the labours of M. Deville; it consists in making the vapours of metallic fluorides act on oxides at a very high temperature. By this means rubies of great beauty were obtained of exactly the same colour and properties as the natural ones, and of a size moreover that entitled them to be really called jewels. In the same manner sapphires were prepared of the true oriental tint, and chrysoberyls precisely resembling those from America, having the same peculiar convergent striæ which are characteristic of that gem.

It was not a little remarkable that the same process occasionally produced rubies and sapphires side by side, the two gems appearing to differ only in the condition in which the colouring oxide existed, the same substances apparently producing a blue or a ruby-red according to its state of oxidation.—*Once a Week*, Nov. 3rd.

FEELING OF BEAUTY AMONG ANIMALS.

Tynron, Dumfrieshire, Nov. 19, 1866.

FROM the ancient references in Eastern literature to the serpent charmers down to modern times, the facts showing that certain animals are gratified by music have been accumulating. He would be a bold man who should say that birds have no delight in their own songs. I have been led to conclude from experiments which I have made, and from other observations, that certain animals, especially birds, have not only an ear for fine sounds, but also a preference for the things they see out of respect to fine colours or other pleasing external features. To begin with ourselves, the pleasure which we derive from a certain class of objects is universal and well marked; even when man becomes animalized this instinct is never lost, but only undergoes modification. Christian babes and cannibals are equally vain of fine clothes, and have a similar passion for beads and glittering toys. Carlyle suggests that the love of ornament rather than the desire of comfort was at the origin of clothes. It is chiefly among birds, when we consider the case of animals, that a taste for ornament and for glittering objects, often very startling and human-like, is to be found. The habits of the pheasant, peacock, turkey, bird of paradise, several birds of the pigeon and crow kind, and certain singing birds, are evidence. The Australian satin bower-bird is the most remarkable of that class which exhibit taste for beauty or for glittering objects out of themselves, that is, beauty not directly personal; collecting, in fact, little museums of shells, gaudy feathers, shining glass, or bits of coloured cloth or pottery. It will be found with many birds that fine plumes, a mirror, and an admirer, are not altogether objects devoid of interest.

Another consideration leading me to the same conclusion, is the fact that beauty in animals is placed on prominent parts, or on parts which by erection or expansion are easily, and at the pairing season, frequently rendered prominent, such as a crest or tail. A spangle of ruby or emerald does not exist, for instance, on the side under the wing, which is seldom raised, of our domestic poultry. Such jewels are hung where man himself wears his, on the face and forehead, or court attention, like our own crowns, trains, shoulder-knots, breast-knots, painted cheeks, or jewelled ears. I cannot account for the existence of these gaudy ornaments to please man, for nowhere are they more gorgeous than in birds which live in the depth of the tropical forest, where man is rarely a visitor; I cannot account for them on the principle that they do good to their possessors in the battle for life, because they rather render them conspicuous to their enemies or coveted by man. But when I consider that the beauty of these beings glows most brightly at the season of their love-making, and that most observers agree that the female is won partly by strength, partly by gesture, and partly by voice, and that the male, whose interest it is to be most attractive, is often in his wedding-suit, the most gaily decorated, it seems to me that beauty, through a wider range than has yet been generally acknowledged, is accessory to love.

Butterflies, it is true, have gay patterns on the under wing, but this rather strengthens than diminishes the force of my argument, for with them, in a state of rest, the wings are folded erect, whereas others of that class, as moths and hawk-moths, whose wings, when at rest, are either inclined, horizontal, or wrapped round the body, have only the upper side of the wings beautiful. It is to be noticed also that these creatures, out of the three states in which they exist, are only remarkable for beauty in that state which they seek their mates, and whoever compares many of their males (as that of the orange-tip) to the females will find that gaudy colouring also favours the former. These delicate and ephemeral creatures are often to be observed flying lazily, as if aware of their splendour, and as if giving time that it might be seen.

Among fishes it is amusing to watch the combats of male sticklebacks for the females, which can be witnessed in an aquarium, and to note how the victor waxes brilliant in hue, and the vanquished, if he survive, wanes greatly in splendour. Fishes, and more especially insects, are often destroyed through the strange attraction which light has for them.

Birds are sometimes caught, especially larks in France, through the same allurement; and those very fire-flies, whose luminosity is so pretty to us, I have no doubt find it attractive to themselves. They are caught by means of their eagerness for light by those West Indian ladies who use them as jewels for their head-dress at a dance.

I am much strengthened in the conclusions at which I have arrived on this subject by the reference made to it by Mr. Darwin in the fourth edition of his work on Species, a copy of which has just now reached me. The selection of beauty in their mates by some animals is there made to follow from their appreciation of it, so that effect and cause mutually throw light on each other. Some profound and interesting remarks are further added by the author, explanatory, on scientific grounds, of the origin of flowers, which strike me, although the remarks are very brief, as being the first likely solution of what has been for ages an inscrutable problem. J. Shaw.—*Athenæum*, Nov. 24th.

ESQUIMAUX IN EUROPE.

WHILE the archæologists were working backwards in time, through the antecedent civilizations of Europe, the geologists, in tracing life from its first appearance on the earth and unfolding its progress, suddenly lighted upon the evidence of man's co-existence with many of the extinct animals in the latest deposits of which they took cognizance—in the river-gravels of Gaul and England, and in the bone caves of England and Belgium. He is proved by his implements and weapons to have been a savage of the lowest grade, unacquainted with the use of pottery, and even ignorant of the art of polishing or ornamenting the splinters of bone or the rough flint that he used. So far from having discovered the metals, he had not even found out that other stones, of different hardness, toughness, and elasticity, were better fitted for some of his purposes than the untractable flint or chert. He had, however, mastered the use of fire; and armed with the bow, the spear, and the sling, made good his foothold in a fauna which comprised the cave-lion, bear, and hyæna. The climate also under which he lived was so much more severe than those now found in the same latitudes, that against its effects the rhinoceros and mammoth, then living in Northern Europe and Asia, were clad in long hair and fur; while the musk-sheep and the reindeer, now confined to the extreme north, were able to range as far south as the Alps and Pyrennees. Glaciers descended from the mountains of Wales, Cumbria, and Scotland, and the winter cold was sufficiently intense to form ice in the rivers thick and strong enough to transport great stones, which are frequently found among the finer gravels in their ancient beds. Geographically, also, Europe was altogether different from what it is now. The Rhine, the Elbe, and the Thames, instead of discharging their waters along the present coast-line, joined to form one great estuary which, after flowing through a plain, entered the North Sea near the latitude of Berwick. The British Channel had no existence, and Britain formed part of the mainland extending far into the Atlantic.

. . . .

The sum of the evidence proves that man, in a hunter state, lived in the south of Gaul, on reindeer, musk-sheep, horses, oxen, and the like, at a time when the climate was similar to that which those animals now inhabit. To what race did he belong? In solving this, the zoological evidence is of great importance. The reindeer and musk-sheep now inhabit the northern part of the American continent, and are the principal land animals that supply the Esquimaux with food. The latter of these has departed from the Asiatic continent, leaving remains behind to prove that it shared the higher northern latitudes of Asia with the reindeer, and this latter has retreated further and further north during the historical period. May not the race that lived on these two animals in Southern Gaul have shared also in their northern retreat, and may it not be living in company with them still? The truth of such an hypothesis as this is found by an appeal to the weapons, implements, and habits of life of the Esquimaux. The fowling-spear, the harpoon, the scrapers, the marrow-spoons, are the same in the ice huts of Melville Sound as in the ancient dwellings of Southern Gaul. In both, there is the same absence of pottery; in both, bones are crushed in the same way for the sake of the marrow, and accumulate in vast quantities. The very fact of human remains being found among the relics of the feast is explained by an appeal to what Captain Parry observed in the Island of Igloolik. Among the vast quantities of bones of walruses and seals, skulls of dogs and bears, found in the Esquimaux camp, were numbers of human skulls lying about among the rest, which the natives tumbled into the collecting-bags of the officers without the least remorse. A similar carelessness for the dead was also observed by Sir J. Ross and Captain Lyon. This presence, then, of human remains in the south of Gaul is another link binding the ancient people then living there to the Esquimaux. Their small size also is additional evidence.

The only reference that can be drawn from these premises is that the people in question were decidedly Esquimaux, related to them precisely in the same way as the reindeer and musk-sheep of those days were to those now living in the high North American latitudes. The sole point of difference is the possession of the dog by the latter people; but, in the vast lapse of time between the date of their sojourn in Europe and the present day, the dog might very well have been adopted from some other superior race, or even reduced under the rule of man from some wild progenitor. By this discovery a new people is added to those which formerly dwelt in Europe. The severity of the climate in Southern Gaul is proved by the northern animals above mentioned. As it became warmer, musk-sheep, reindeer, and Esquimaux would retreat further and further north, until they found a resting-place on the American shore of the Great Arctic Sea. Possibly, in the case of the Esquimaux, the immigration of other and better-armed tribes might be a means of accelerating this movement. We know nothing of the date of his dwelling in Europe, except that he succeeded the earliest race of man, and was himself followed, after an unknown interval of time, during which great climatic changes took place by the polished-stone-using-folk. In the scale, then of the former occupants of Western Europe we have, first, the flint-folk of the geologists, then the reindeer folk, or the Esquimaux, then the polished-stone-using-folk, then the Celts, and lastly the Teutons.—*Saturday Review*, Dec. 8.

ORIENTAL MYSTERIES.

THESE are sold in envelopes or packets at 1s. per packet, each of which contains 25 "mysteries." In the state in which they are purchased they are of no apparent shape or make. Some appear like pieces of a common lucifer match; others like little dirty, irregular chips of a soft wood; and others, if I may so express myself, like nothing at all. In this state they appear quite useless, and certainly are not worth 1s., but immediately upon dropping one of them into a cup or saucer of hot water, it changes into a star, a fish, a flower, or some other tangible form. The change is instantaneously effected by coming in contact with the water, and the worthless-looking splinter of dried wood expands to many times its original size, and, what is more, the specimens, when so enlarged, are many of them highly coloured, representing, more or less accurately, not only the form but the colour of the objects for which they are intended. As might be supposed, the quickness of the expansion and the power of increasing to so many times the original bulk, has caused many inquiries to be made as to what the material could be of which these "mysteries" are made, and whether that material, whatever it might be, is treated chemically. I was fortunate enough to have put into my hands a "mystery" of large size, containing more solid material than those sold in the London shops, and on close examination I was enabled to determine the nature of the substance, which is simple vegetable tissue without any preparation whatever. The plant yielding it is a common one in the East, and is known as the Shola (Æschynomene aspera), belonging to the Leguminosæ or Pea Family. It is a marsh plant, and grows in abundance in the lakes and jheels of Bengal, as well as in other parts of India. If the objects are veritably of Japanese manufacture, it would seem that the stems of the Shola must have been obtained in the first place from the East Indies, as the plant is not known to grow either in China or Japan. It seldom attains a greater height than 8 or 10 feet, and the diameter of its stems is not more than 2½ inches. The wood is remarkably soft and light—so light indeed as to appear nothing more than a mass of cellular tissue, and might readily be mistaken for pith; but upon microscopic examination, the annular rings and medullary rays are distinctly visible, though exceedingly fine. It is the large amount of cellular tissue present which causes so great a degree of expansion to take place. When dry, and submitted to pressure, the cell walls collapse, and are pressed against each other, but upon coming in contact with heat and moisture when placed in hot water, the cells immediately absorb the moisture, and regain their natural bulk; the effect of the moisture also expands the vascular tissue or woody fibre, and in that way causes the instantaneous opening of the chip-like objects. The material is in common use amongst the natives of the East Indies for the manufacture of various articles, both of dress and domestic use; its extreme lightness recommends it for many purposes, such as fishing floats, swimming jackets, bottle cases, but more especially for hats, as it is a bad conductor of heat, and the hats can be made of almost any thickness, and still be exceedingly light. For modelling it is a favourite material with the natives, who turn out some really beautiful articles with it. There is a very fine model of a temple made of the Shola in the East Indian Museum, and another in the Kew Museum. The stems are usually cut about the months of April and May, and are commonly sold in the bazaars at Calcutta. From the foregoing description it will be seen how simple in structure these startling "mysteries" are, and how easily and cheap they may be made. From a very thin slice of the wood a large number could be produced, and many such slices could be cut from one stem. I believe that the "mysteries" hitherto sold in London have all been imported from India or Japan, but there is no reason why they should not be made in this country, and perhaps at a cheaper rate than purchasing them of the Eastern manufacturers. The material, if the demand for the articles continued, could be imported in almost any quantities from the East Indies, and by cutting the stem up into thin slices, and then stamping the objects out with a kind of die, thousands could be produced and rolled into a small compass in a very short space of time. *F.—Gardeners' Chronicle, Dec. 15th.*

COMETS.—On the 27th February, 1826, Professor Biela, an Austrian astronomer of Josephstadt, discovered a small comet. When its motions were carefully studied, it was found by M. Clausen, another of those indefatigable German computists, that it revolved in an elliptic orbit in a period of 6 years and 8 months. On looking back into the list of comets, it proved to be identical with comets that had been observed in 1772, 1805, and perhaps in 1818. Its return was accordingly predicted, and the prediction verified with the most striking exactness. And this went on regularly till its appearance (also predicted) in 1846. In that year it was observed as usual, and all seemed to be going on quietly and comfortably, when, behold! suddenly on the 13th of January it split into two distinct comets! each with a head and coma and a little nucleus of its own. There is some little contradiction about the exact date. Lieutenant Maury, of the United States' Observatory of Washington, *reported officially on the 15th having seen it double on the 13th*, but Professor Wichmann who *saw it double on the 15th* avers that he *had a good view of it on the 14th*, and remarked nothing particular in its appearance. Be that as it may, the comet from a single became a double one. What domestic troubles caused the secession it is impossible to conjecture, but the two receded farther and farther from each other up to a certain moderate distance, with some degree of mutual communication and a very odd interchange of light—one day one head being brighter, and another the other—till they seemed to have agreed finally to part company. The oddest part of the story, however, is yet to come. The year 1852 brought round the time for their reappearance, and behold! there they both were, at about the same distance from each other, and both visible in one telescope. The orbit of this comet very nearly indeed intersects that of the earth on the place which the earth occupies on the 30th of November. If ever the earth is to be swallowed up by a comet, or to swallow up one, it will be on or about that day of the year. In the year 1832 we missed it by a month. The head of the comet enveloped that point of our orbit, but this happened on the 29th of October, so that we escaped that time. Had a meeting taken place, from what we know of comets, it is most probable that no harm would have happened, and that nobody would have known anything about it. It would appear that we are happily relieved from the dread of such a collision. It is now (February, 1866) overdue! Its orbit has been recomputed and an ephemeris calculated. Astronomers have been eagerly looking out for its reappearance for the last two months, when, according to all former experience, it ought to have been conspiciously visible, but without success, giving rise to the strangest theories. At all events, it seems to have fairly disappeared, and that without any such excuse, as in the case of Lexell's, the preponderant attraction of some great planet. Can it have come into contact or exceedingly close approach to some asteroid as yet undiscovered; or, peradventure, plunged into and got bewildered among the ring of meteorolites, which astronomers more than suspect?—*Herschell's "Familiar Lectures."*

MOUNTAIN SILK OF NORTH CHINA.—Mr. Consul Meadows, whose consular district includes Manchooria and Eastern Mongolia, reports that mountain silk remains as yet the one article which the district is likely to furnish to England. There are two crops of the mountain cocoon, a spring and an autumn; the autumn much the largest, but the spring greatly superior in quality. In the autumn the cocoons intended for the spring crop are placed in baskets, which are hung up in Chinese dwelling-rooms facing the south, but still having a temperature in the greater part of the winter considerably below freezing-point. The natural heat of spring suffices to bring the chrysalis out of the cocoon in the butterfly state. The butterflies then couple, eggs are produced in four or five days, and are laid on paper spread upon mats and tables. In a few days each egg produces a very small black worm, which is nourished by young oak leaves that are gathered and scattered over the paper. After some days the worms are transferred to the oak bushes on the hill slopes. After its first sleep or torpor of a couple of days, the worm becomes green in colour and larger in size. For its fifth sleep it prepares by spinning itself into a cocoon, in which it assumes the chrysalis shape. When the worm begins to make its cocoon, it selects two or more oak leaves, more or less facing each other, and joins them together by a network of the silk thread, which keeps issuing from its mouth as it moves its head from the one leaf to the other, holding on by its back claws to the twig from which the leaves grow. When the leaves are sufficiently joined to form a sort of cup or basket under the twig, the worm drops into the receptacle it has thus formed, first quite surrounds itself with the loose, flossy-like, silk which forms the outer portion of the cocoons as they come to market, and then proceeds to thicken the inner surface by further thread-spinning, till its bulk is sufficiently decreased for its turning into the chrysalis shape. The best silk is produced by nourishing the worms on the leaves, not of the oak, but of the "Tseen-tso-tsze," which exists, however, only in small quantities. The chrysalids which are not kept for breeding are used by the Chinese as an article of food. Not a tenth of the hill-sides suitable for the oak bushes are at present planted with them. But considering the quantity of silk already produced, it may be taken that the trade could be developed into one of appreciable importance even for our great manufacturing interests, unless exactions and jealousies of the local mandarins interposed to repress it.—*Gardeners' Magazine Nov. 24th.*

THE CAMEL.—The popular notion of a camel connects it with the burning sands of the Arabian or African desert; but the one-humped race of Turkistân, equally (it would seem) with the two-humped or Mongolian species, is capable of enduring the opposite excess of cold. The Abbé Huc describes the two-humped kind, when the temperature was at zero of Fahrenheit, standing on the brink of a precipice and inhaling, with apparent satisfaction, the bitterly cold gusts from the north; and in Mantchuria, it seems that the loads are annually transferred from the backs of these two-humped camels to those of rein-deer, who convey them a further distance poleward. The one-humped camel of Turkistân is, in like manner, capable of withstanding the terribly severe winter of the Khiva steppe, as described in Col. Abbott's narrative of his winter journey over that desolate region, from Herât *viâ* Khiva to the Caspian. Near the Aral he met with "a double-humped camel," which he then regarded as a curiosity; and it follows, therefore, that his own train of camels must have been single-humped; and he remarks of them—"The magnificent camels, in their long, shaggy fur, hardly heed the weather. The icicles hang from their beards, and hoar-frost garnishes their heads. Their large, full, lustrous eyes seem acquainted with hardship, but not with trouble. They are the very philosophers of patience, who conquer all things by tranquillity of spirit." Still accompanied by them, he observes: "The cold is now excessive; the intense chill of the north wind, in these parts, cannot be imagined by any who have not so wintered on an extensive continent. The breath clings in icicles to the pillow and bed-clothes within the tent. Towels hung up to dry in a close room with a fire, or in the sun, are instantly stiffened into ice; and water freezes hard within three feet of a charcoal fire." Yet he says nothing of his camels suffering; and he observed "wild asses" (*ghor-khurs*) in abundance, and flocks of the saiga antelope, there termed "kaigh." He counted eight hundred *ghor-khurs* in a single herd. This was after passing the solitary individual of the double-humped species, which was a stranger in that part of Khorásân, and a novelty to him, clearly indicating that his own camels (which withstood so severe a temperature) were single-humped.—*Land and Water*, Nov. 17th.

PLANTS OF NEW ZEALAND.—The following communication was read at the Botanical Society of Edinburgh, *Nov.* 8, Prof. Balfour, Hon. Sec., in the Chair. I. *On plants collected at Otago, New Zealand.* By Dr. W. Lauder Lindsay. 1, Fungi; 2, Mosses; 3, Hepaticæ; 4, Ferns. In speaking of Tree Ferns, the author remarked that 6.81 per cent. of Otago Ferns were aborescent. These Tree Ferns rank, as regards beauty, and frequently as regards height, girth, and usefulness, with the exogenous forest trees with which they are generally more or less intermixed. Cyathea Smithii is the most common species in Otago. Dicksonia squarrosa and D. Antarctica are also marked Tree Ferns of the district. In the South Island of New Zealand, Tree Ferns are associated with glaciers, snow, and other evidences of an alpine and rigorous climate. There are also found bordering on glaciers Fuchsia trees and Cabbage Palms associated with Araliacæ, Myrtaceæ, and other trees usually regarded as denizens of comparatively warm climates. The largest glacier, Mount Cook (13,000 feet elev., in lat. 43½ deg.), which gives rise to the Waivan river, descends as low as 500 feet above the sea level on the west coast of Canterbury, and within eight miles from the sea. On both sides of this glacier luxuriant forests of Tree Ferns; Cordylines, Myrtaceæ, and other temperate and sub-tropical types are found. And no great distance from these glaciers are found true Palms (Areca sapida). In the mountainous forests and ravines of Nelson Tree Ferns ascend to 2,000 feet. The acclimatisation of New Zealand Ferns in Britain has been lately attracting the attention of horticulturists. Dr. Lindsay, however, doubts whether these plants will be hardy enough to stand the severest British winters without protection. The classification and nomenclature of New Zealand Ferns furnish us with some notable instances of the proneness to error in reference to climate, and in the definition of genera, species, and varieties. Dr. L. states that 30 species have been made out of Ophioglossum vulgatum, 20 different names are given to Pteris aquilina (the common Bracken), and about a dozen species have been manufactured out of Lycopodium clavatum. The variability of the species of New Zealand Ferns is remarkable. This was illustrated by species of Asplenium, Lomaria, Aspidium, Hymenophyllum, &c.

AMBER.—This word is derived from the Arabic:—"The well-known substance so called is a fossilized resin of certain unknown coniferous trees, of the fir or pine genus. Great virtues were attributed to it by the ancients. Pliny tells us that Sophocles held amber to be the petrified tears which the birds of Meleager dropped to the memory of that great hero of mythology. Amber has been among the moderns a subject of great discussion. The mystery in which it was involved was increased by the circumstance that Hebrew and Arabic characters were often found engraved upon it, in a perfectly legible state. Dr. Thomas, of Kœnigsburg, has given us the explanation of this singular fact by stating that the pieces of amber so engraved were neither more nor less than seals. Many of them are preserved in the Museum of Portici, but chiefly brought thither from Herculaneum. The largest known deposit of amber lies on the Prussian coast of the Baltic; it is found in a bed of lignite, which is supposed to extend far under the sea. Another deposit of amber lies almost horizontally on the outskirts of Dirschheim, at a depth of only four feet from the surface. Pieces of amber are often found lying on the coast after a storm. Thus, on the first of January, 1848, upwards of 400 kilos. of this substance were thrown out of the sea within a very small space. Amber has been known from the highest antiquity, and important medical properties were attributed to it; even now it maintains its place in our pharmacopœias, together with the oil distilled from it, as a stimulant, an astringent, and an anti-spasmodic. Amber necklaces have been found in Celtic tombs both in England and Brittany. Regnard tells us that in his time the Margrave of Brandenburg presented the Emperor of Russia with an arm-chair entirely of amber, and the Dauphin with a mirror of the same material. In 1599, a block is said to have been found on the coast of Melinda so large that a man was able to hide himself behind it. Amber has this curious property, that when it is slightly warmed by friction on a piece of cloth or any other woollen stuff it will attract straw or grasses. Hence the science of electricity has its name from "electon," its classic name; and it is thus that dealers are enabled to distinguish between the real and imitation article.—"Varia," in *La Liberté.*

MODE OF CATCHING SHARKS IN POLYNESIA.—Perhaps as remarkable a mode of catching sharks as any, is that I have heard narrated by Rarotonga men, as practised by their neighbours on the island of Aitutaki, one of the Harvey group. At one end of the island is a large lagoon, formed by the reef that runs round it, stretching far out from the land, and there the sharks breed, and are regularly fed. As they are very prolific, I have seen as many as twenty-five and sometimes thirty little ones taken out of a shark; they increase rapidly. When any feasting is going on amongst the natives, sharks being held necessary to complete the variety of food, parties are sent out to catch them in the lagoon. Provided with a strong rope and a supply of bait, two or three young men start off in a canoe, and, taking up a position over the haunts of the sharks, throw over bait after bait, until the greedy monsters have eaten to repletion. Waiting quietly in their canoes, the fishermen soon see the sharks stretching themselves lazily on the sand, with their heads just out of the caves formed by the overhanging rocks that rise from the bottom of the lagoon. With a noose in the end of the rope, which he holds in his hand, a man quietly slips from the canoe into the sea, dives down to a shark, slips the noose over his tail, and, as with the jerk of the rope he tells the men above the prey is fast, he himself, with a strong spring from the ground, swiftly rises to the surface. All pulling away at the rope together, the shark is soon brought to the water's edge, and, as the tail is raised out of the sea, he becomes almost helpless; then, with a strong pull together, after a moment's spell, the shark is suddenly bounced into the canoe. Frequently, as the shark lies at the mouth of a cave, with only his head out, the tail cannot be reached. The diver then has to tap the monster gently on the head, who, lazy and drowsy after the good feed just supplied from the canoe, quietly turns his tail to the intruder—and, by Jove, on slips the noose before he knows it is there.—*Pritchard's Polynesian Reminiscences.*

PLUMS AS ORCHARD TREES.—The Diamond Plum originated at Brenchley, in Kent; and was named after the raiser, who was foreman to Mr. Hooker, of the (then) Brenchley Nurseries. There is also one in cultivation called the "Dummer," which is the same kind. The Diamond is in great demand, being a showy market plum, and if gathered a few days before ripening it retains a fine bloom and travels well.

The Prolific Damson is a very abundant bearer. We have seen young trees with as many fruit as leaves, and in many places the shoots were completely hidden by the clustering fruit. It is also called locally the "Cluster Damson," "Farleigh Damson," and "Crittenden's Damson." We have had fruit on maiden trees in our nursery gardens. It has been but four or five years in the trade, and is not so widely known as its merits deserve. A vast quantity of these and other damsons find their way into cheap port wine.

The Cheshire Damson is largely grown, and the old sort with bullaces, is generally planted at the edges of plantations for shelter, to "break the wind" as the farmers say. Besides those named by Mr. Robson, the following are coming into repute with fruit-growers:—

Prince Englebert.—A sturdy grower, and a free-bearing kind; its upright growth is greatly in its favour, and the fruit, though large, is not liable to crack.

Mitchelson's Damson.—As large as a small plum, a free grower, and a heavy cropper. It will take first rank as a market plum; though it has been known in the London markets for some years, it was only recently introduced here by us.

Rivers's Early Prolific and Rivers's Early Favourite are being more planted every year. They are most valuable sorts; the fruit finds a ready sale at a long price, and the trees, though fine-wooded, are pretty strong in a few years, and bear well.

Bush Plum.—A very valuable marked plum; its late season and abundant cropping make up for its deficient flavour. It is largely grown in some parts of Kent. A sturdy grower, and not so liable to split and break as many plums are. It is a good kitchen plum; medium-sized fruit.—*Cottage Gardener*, Nov. 13th.

GEOGRAPHY OF ABYSSINIA.—The geographical position of Christian Abyssinia, its political institutions, its religious condition, are fully described in a singularly able paper, enclosed in Mr. Plowden's despatch of the 20th June, 1852. The first of these is simple and easily defined. The northern boundaries do not reach within a hundred miles of the Red Sea at any point; and the interval is occupied by various savage tribes, all Mohammedan, all except the Gallas, totally without government, living by their flocks and camels, and engaged in incessant feuds. The only good harbour in the Red Sea is Massowah; and the Turks own the island, and claim the coast for sixty miles inland. So much for the north. The western boundary is the pashalic of Sennaar. To the south-west, vast forests, frequented by wild beasts, or hot plains inhabited by negro races, exclude Abyssinia from the navigable part of the Blue Nile, whose impetuous torrent, on the other hand, protects the country from the daring and dauntless Gallas, a fine race, whose men are brave and honest, and whose women are beautiful. On the east and south-east are various tribes of fierce and fanatic Mohammedans, who are themselves barred from the sea by the savage Adaiel, by whose hordes, led by the famous chief, Mohammed Grayne, Abyssinia was nearly destroyed, when Portugal interposed, and saved it by the introduction of firearms. Stretching all along the eastern boundary, again, to join the north, are other savage tribes, once Abyssinian, and still speaking the ancient Ethiopic tongue, but all lawless and inimical. The country which lies within this pleasant border is a range of vast table-lands and fantastic mountains, varying from four thousand to fourteen thousand feet above the level of the sea. Deep valleys, the beds of the larger rivers, intersect this, but however circuitous their course, all these streams finally join the Blue Nile. They are nowhere navigable, and only a few mountain-torrents, swollen by the rain, find their way to the Red Sea. The valleys teem with the richest produce; and the soil is capable of growing everything which will grow anywhere; but there is little cultivation in proportion to the extent of territory. The scenery is varied and beautiful, and the country combines mineral resources, a delightful climate, tropical luxuriance, and such salubrity that no waste of European life need be apprehended from frequenting it.—*Chambers's Journal*, Nov. 17th.

FERNS.—Though ferns now occupy a conspicuous place in our gardens, and are in high favour with cultivators, it is only in comparatively recent times that they have been brought into notice. During the last century certain classes of plants came into fashion, and after a season of popularity again fell into disrepute. Thus: Tulips were once the rage. At the time of the establishing of the several provincial Botanic Gardens, all of which were founded upon a strictly botanical footing, though many of them have now, to a greater or less extent, degenerated into places of amusement, the plants in greatest demand were those of our New Holland and Cape colonies, principally the Heaths, *Proteas*, *Aloes*, and their kindred. In after years dealers obtained large prices for cactuses; but, with the exception of a few of the easily-grown and most showy kinds, these are now scarcely saleable. Still more recently the magnificent flowering orchids were promoted to the first place in our gardens; and though these may still be said to maintain their position, the expense attending their cultivation is so great that they are for the most part confined to the gardens of the wealthy. Ferns, on the contrary, may, as a general rule, be grown in a comparatively inexpensive manner. The discovery made by Mr. N. B. Ward, that these plants can be grown to great perfection in small ornamental closed cases (now well-known as "Wardian Cases"), suitable not only for the drawing-rooms of the wealthy but for humbler dwellings, renders it possible for amateurs to indulge their love of ferns without going to the expense of erecting hothouses and employing a staff of gardeners; and it is to be hoped that this will be the means of retaining them in favour and spreading them still wider. The enumeration shows that at the present time above nine hundred exotic species of ferns are cultivated in the various public and private gardens in this country; and of these by far the greater number have been introduced during the last quarter of a century.—*Smith's Ferns, British, &c.*

THE WEST INDIA SPONGE FISHERY.—At present, perhaps owing to the large reduction in the collection and exportation during the late war in the United States, the supply of Bahamas sponge is not equal to the demand, and prices rule high. In the ten years ending 1864 the average export was 3,330 cwt. per annum, valued at £17,369. But four or five years ago as much as 5000 to 6000 cwts. were shipped from those islands. Bahamas sponge is inferior to the Mediterranean kinds, and a quarter of a century ago it was of little value. It was simply classed as coarse and fine, the former including the qualities now known as velvet, sheepwool, and grass, and selling for four to five dollars the cwt., the fine, or glove sponge, at 10 dollars. Now it is divided into the eight following classes, to each of which is affixed the average price per pound which it fetched in 1864:—1st, common, or boat sponge, with white or yellow tissue, called in the island sheepwool, and in America carriage sponge; 2nd, common, or velvet sponge, with brown tissue; 3rd, large fine brown (fine hard-head), all these three 1s. 8d. per pound; 4th, large coarse brown (coarse hard-head), 10d. per lb.; 5th, common coarse, or grass sponge, 4d. per lb.; 6th, large fine, soft tissue, not strong, called glove sponge, 4d. per lb.; 7th, small fine, soft tissue and good forms, called beef sponge, 2s. 6d. per lb.; 8th, small fine, hard tissue (small fine, hard-head, or hard brown), best quality, also often called beef sponge, 1s. 3d. per lb. Of late years sponge has been applied to a great many new purposes. The price of some qualities has doubled, of others quadrupled, and of some, such as velvet and sheepwool, for which apparently there could have been no foreign demand, the price is ten times greater than formerly. Large quantities of all the above kinds are sent to the United States, of the velvet and glove sponge to England, while France takes the finest qualities. There they undergo a final operation of cleaning and dyeing.—*Queen*, Nov. 10th.

SPECTRUM ANALYSIS OF STARS.—The results of spectrum analysis as applied to the heavenly bodies were discussed at considerable length by Mr. William Huggins, F.R.S., in a lecture read before the British Association in August last. Mr. Huggins concluded by summing up the new knowledge that has been gained from observations with the prism, as follows:—1. all the brighter stars, at least, have a structure analogous to that of the sun; 2, the stars contain material elements common to the sun and earth; 3, the colours of the stars have their origin in the chemical constitution of the atmospheres which surround them; 4, the changes in brightness of some of the variable stars are attended with changes in the lines of absorption of their spectra; 5, the phenomena of the star in Corona appear to show that in this object at least great physical changes are in operation; 6, there exist in the heavens true nebulæ: these objects consist of luminous gas; 7, the material of comets is very similar to the matter of the gaseous nebulæ, and may be identical with it; 8, the bright points of the star clusters may not be in all cases stars of the same order as the separate bright stars. It may be asked, Mr. Huggins adds, what cosmical theory of the origin and relations of the heavenly bodies do these new facts suggest? It would be easy to speculate, but it appears to me that it would not be philosophical to dogmatise at present on a subject of which we know so very little. Our views of the universe are undergoing important changes. Let us wait for more facts, with minds unfettered by any dogmatic theory, and therefore free to receive the obvious teaching, whatever it may be, of new observations.—*Mechanics' Mag.*, Nov. 24th.

ERUPTION OF THE STROKKUR.—While the travellers were engaged in collecting these delicate formations, they were surprised and delighted by a sight which has fallen to the lot of but few previous visitors to Iceland—a gigantic and voluntary eruption of the Strokkur. Behind them a subterranean thunder suddenly began rolling, and a pillar of dense white steam shot up from the Strokkur into the air with the speed of an arrow; this steam contained in its centre a cylindrical jet of water, at least ten feet in diameter, which at the top parted like a gigantic pine tree into various arms, whose ends, dissolving into dazzling white mist, flew away in all directions. The jet had scarce sunk again to half its length, with the same speed as it ascended, ere it rose again with astounding rapidity and a deafening roar, so that it could scarce be followed with the eyes. Countless other jets shot forth from the steam-like rockets, with a hissing sound, and also dissolved into a fine dust rain, whose pearls slowly fell to the ground, while immeasurable steam-clouds brooded over the whole scene. Ere long it seemed as if the giant's strength were exhausted, and the fatigued pillar were about to break down, but it rose again to a height not before reached, with even greater speed and louder thunder. So great was the power of the steam that although there was a strong breeze blowing, the jet was not at all driven out of the perpendicular. This wondrous spectacle lasted for fifteen minutes, until the fury was spent and the pillar of water fell back not to rise again; the greatest height which it attained was 140 feet.—*Day of Rest*, Dec.

DESSERT FRUITS IN 1256.—The only kinds of fruits named in the Countess of Leicester's expenses are apples and pears. Three hundred of the latter were purchased at Canterbury, probably from the gardens of the monks. It is believed, however, that few other sorts were generally grown in England before the latter end of the fifteenth century; although Mathew Paris, describing the bad season of 1257, observes that apples were scarce and pears scarcer, while quinces, vegetables, cherries, plums, and all shell fruits were entirely destroyed. The shell fruits were probably the common hazel-nut, walnuts, and perhaps chesnuts. In 1256, the sheriffs of London were ordered to buy two thousand chesnuts for the King's use. In the wardrobe book of the 14th of Edward the First we find the bill of Nicolas, the Royal fruiterer, in which the only fruits mentioned are pears, apples, quinces, medlars, and nuts. The supply of these from Whitsuntide to November cost £21 14s. 1½d. This apparent scarcity of indigenous fruits naturally leads to the inquiry what foreign kinds besides those included in the term spicery, such as almonds, dates, figs, and raisins, were imported into England in this and the following century? In the time of John and of Henry the Third, Rochelle was celebrated for its pears and conger eels. The sheriffs of London purchased a hundred of the former for Henry in 1223.—*Timb's Nooks and Corners of English Life.*

VITALITY OF SEEDS.—In a paper addressed last week to the Academy of Sciences, M. Pouchet, the celebrated physiologist of Rouen, gives an account of some experiments of his on the vitality of the seeds of the *Medicago Americana*, a sort of clover. A vast quantity of wool is received at Elbœuf, from Brazil; but it is in a very dirty state, and contains amongst other impurities, the seeds of various plants. M. Pouchet was told by several credible witnesses that the seeds mixed up with this wool would strike root and grow up into plants even after undergoing a four hours' ebullition during the various operations of dyeing. This was a startling assertion, it being admitted on all hands by physiologists, from Spallansani downwards, that the vitality of seeds is utterly destroyed in boiling water. M. Pouchet resolved to verify the truth of this alleged fact, and accordingly boiled some of these seeds for exactly four hours without any interruption. After this operation the seeds of the Medicago were found to be enormously swollen; the water had become mucilaginous, and it was with no great faith in the success of his experiment that our author put these disorganized seeds into flower-pots containing earth utterly free from any seeds of the same kind. Nevertheless, in the course of from 10 to 20 days, several roots sprang up; and this experiment was repeated more than 20 times with equal success. After minutely examining all the circumstances, M. Pouchet at length found that among a large number of seeds in a state of utter disorganization there were yet a few that had successfully resisted the action of boiling water. They had, indeed, borne the temperature of 100 deg. Centigr. for the space of four hours, but their outer tegument had proved watertight by some unexplained circumstance. Our author immediately concluded that such must also be the case with other seeds, and he accordingly tried with wheat, barley, millet, &c., but without success; for the present the seeds of the Medicago are the only instance of this wonderful vitality.—*Galignani.*

GEOLOGY OF UPPER EGYPT.—At the first cataract the Nile flows over crystalline rocks consisting principally of quartz, felspar, and hornblende, combined in various proportions, and then appearing under the forms of syenite, greenstone, hornblende, and mica-schists, or else occurring in separate masses. In the bed of the river the surface of the harder portions of these rocks is beautifully polished. The whole district is traversed by dykes of greenstone, of which the prevailing direction is E. and W. The crystalline rocks forming the bed of the river are overlain by a sandstone, sometimes coarse and gritty, and at other times fine-grained and compact. The prevailing colour is light-yellow, but in places it is dark-purple and even black, owing to the presence of iron. As yet no organic remains have been discovered in it. This sandstone rest on the uneven surface of the syenite in slightly inclined strata, dipping N.N.E. It is nowhere altered at its junction with the syenite, nor is it anywhere penetrated by dykes. To the eastward of the first cataract in a wide valley, commencing opposite the Island of Philæ, and joining the Nile valley again about three miles below Assouan. Through this valley the Nile may have formerly flowed, as freshwater shells and deposits of Nile-mud are found at a considerable height above the present level of the river. To the westward of the first cataract the crystalline rocks disappear below the sandstone, and the country is almost entirely covered with sand of a rich yellow colour, composed of fine rounded grains of quartz.—*Paper read at the Geological Society*, Dec. 3.

New Books.

[*Our limited space must of necessity compel us to give but very short notices of new books, but they will perhaps serve as a guide as to what books our readers may ask for at their libraries.*]

Principles of Geology, or the Modern Changes of the Earth and its Inhabitants. By Sir Charles Lyell, Bart., M.A., F.R.S. Tenth Edition. Vol. I. London: John Murray.

After a lapse of thirteen years and a half Sir Charles Lyell has reissued his celebrated "Principles of Geology"—a long interval, as he says, in the history of the progress of a science. As our readers may expect, he has found it necessary to re-write some chapters and recast others, introducing a large quantity of new matter.

The Principles (to quote from his preface) treat of such portions of the economy of existing nature, animate, and inanimate, as are illustrative of geology, so as to comprise an investigation of the permanent effects of causes now in action which may serve as records to after ages of the present condition of the globe and its inhabitants. Such effects are the enduring monuments of the ever-varying state of the physical geography of the globe, the lasting signs of its destruction and renovation, and the memorials of the equally fluctuating condition of the organic world. They may be regarded, in short, as a symbolical language, in which the earth's autobiography is written.

When the work first appeared in 1830 it embraced, not only a view of the modern changes of the earth and its inhabitants, but also some account of those monuments of analogous changes of ancient date both in the organic and inorganic world. This last part was in 1838 omitted, and enlarged into a separate treatise, and called the "Elements of Geology," of which there has been six editions, the last in January, 1865. In separating the works much matter was retained in the Principles which might be regarded as common to both, such as the historical sketch of the early progress of geology, &c. In 1863 was published the "Antiquity of Man," the subject matter of which coincided in part with the fossil remains of man and his works in both the Elements and Principles, but in the former it was more expanded. The manner in which the origin of species is handled in the "Antiquity of Man," the author tells us, will be found to be different in many respects from that in which he will view the same subject in the concluding volume of this work.

For the benefit of such of his readers as are acquainted with his earlier editions, he gives a list of the chief additions now made, from which we give the following on

ARTESIAN WELLS.—An analogous phenomenon is recorded at Reimke, near Boctumi in Westphalia, where the water of an artesian well brought up from a depth of 156 feet several small fish three or four inches long, the nearest stream in the country being at the distance of some leagues. In some artesian wells sunk by the French in the north eastern part of the desert of Sahara small fish have been frequently brought up alive with the first gush of the water from a depth of 175 feet. M. Desor informs us that in January, 1863, he saw some of these fish in a well in the oasis of Ain Tala. They were of the genus Cyprinodon, not blind like those taken from the underground caverns of Adelsberg or Kentucky, but with perfect eyes. The nearest ponds or lakes were at a great distance on the surface of the desert, and in this and the other cases before mentioned of the subterranean transportation of shells, fish, and fragments of plants we see evidence of the water not having been simply filtered through porous rock, but having flowed through continuous underground channels. Such examples suggest the idea that the leaky beds of rivers are often the feeders of springs.

It would seem very like presumption for us to attempt to speak highly of a book that is known to all the world. The learned author has made for himself a reputation which will last until that time when perhaps the earth shall undergo one of the many changes it has undergone before, and with mighty volcanic action sweep us poor helpless mortals off the face of it. As other works from his pen have grown and grown until a few pages have become volumes, so this edition has increased and improved upon all former ones. We hope at some future time another edition from him will improve and enlarge upon this.

Polynesian Reminiscences; or, Life in the South Pacific Islands. By W. T. Pritchard, F.R.G.S., F.A.S.L., formerly H.M. Consul at Samoa and Fiji. Preface by Dr. Seemann. With Illustrations. Chapman and Hall.

This is a very interesting account of fifteen years' residence in Tahiti, Samoa, and Fiji, the first two chapters containing a brief account of Tahiti, and the remainder giving the author's experience and observations as consul of Fiji and Samoa. It contains much useful information about Polynesian manners and customs, and is worthy, in the estimation of Dr. Seemann (who writes the preface) of being ranked with "Ellis's Polynesian Researches" and "Mariner's Tonga," the two standard works on the subject.

There are many curious legends of the religion and mythology of the native Fijians and Samoans, who, at the present day, are pretty much alike, but who seem formerly to have been of different origin, the first inhabitants of Fiji, according to Mr. Pritchard, having been Papuans, black skinned, rough, and very muscular, with short bushy hair; while the Samoans were of Malay parentage, with reddish brown soft skins, long straight hair, of larger build than the Fijians, but with much less energy.

There are also many pages of matter relating to the natural history of the Islands, written in a pleasing and readable manner, which will well repay perusal.

Physical Geography. By Professor D. T. Ansted, F.R.S., F.R.G.S., F.G.S., Honorary Fellow of King's College, London, and late Fellow of Jesus College, Cambridge. London: W. H. Allen and Co.

We are glad to welcome this volume of Professor Ansted's, and to have the opportunity of calling attention to it in this our first number. The Professor's object seems to be to enable the general reader or the student to obtain an outline of the main facts, in language as simple and definite as possible, and, as far as we can see, this is admirably carried out. Physical geography regarded as a science, although of deep interest to us all, cannot be treated of so as to make light reading; but the statement of numerous facts, and the close reasoning necessary on such a subject, are so handled and classified by the author as to render the whole far from difficult or tedious. The Professor is careful to tell us that he does not claim the present volume to be complete; and while in some cases "the conclusions arrived at differ most from popular notions," he believes "they are not inconsistent with the views of those who are recognised, both in England and on the continent, as the ablest pioneers of science." This is a question we cannot pretend to determine. The volume is divided into six parts, comprising, first, a General Introduction; then Earth; thirdly, Water; fourthly, Air; fifthly, Fire; and, lastly, Life; and altogether will, we believe, supply a serious want, often felt.

The Vegetable World. By Louis Figuier. Translated by W. S. O., 8vo, pp., 574, with numerous Illustrations. London: Chapman and Hall.

A handsome volume, translated from the French of M. Figuier, the well-known author of the "World before the Deluge." It is beautifully printed and illustrated, containing over 400 woodcuts and 24 full-page illustrations, the majority drawn from nature by M. Faquet. It is intended to place before the reader a popular and entertaining work on the vegetable world, combining instruction and amusement; and so far the object seems well attained, for the multitude of good examples of the different varieties of plants and the graphic way in which they are placed before the reader, with the illustrations picturing them, must make the subject interesting even to those who look upon the study of botany as dry and tedious.

It is divided into four parts, the first treating of the Physiology; second, Classification; third, the Natural Families; and the fourth, the Geographical distribution of plants.

A Winter with the Swallows. By Matilda Betham Edwards. Hurst and Blackett.

A cheerful and spirited account of a winter spent in Algeria. As a fair specimen of the author's style, we extract the following from her excursion into Kabylia:—

> Soon after leaving Tiziozou we crossed a broad river-bed, and then entered a wholly new and beautiful region. The road—such a road as only French military roads can be—wound corkscrew fashion about the hills, which were verdant from base to summit. Now we passed under a natural arch of olive boughs; now we came upon a sunny plateau with fields of corn and orchards of the fig-tree, the wild plum and the almond on either side. Everywhere smiled a happy nature; everywhere was the evidence of peace and plenty. As we advanced more and more into the country, traces of French civilization disappeared, and instead of the straight little houses with their rows of carob-trees, new church and handsome drinking fountain, we saw on every crest and mountain-top a Kabyle village, looking, I dare say, precisely as a Kabyle village looked a thousand years ago. Anything more picturesque and poetic than the scenery of Grand Kabylia cannot be conceived. The lovely hills, purple

or green or golden as the light made them, each crowned with a compact mass of tiny stone houses, the deep valleys of tender green, the lofty rocks bristling with wild cactus, the groves of majestic olives, the distant panorama of blue snow-tipped mountains—all these features made a picture not easy to forget. . . . . The journey from the Metidja and ascent of Fort Napoleon reminds one of the long ride across the Campagna to Tivoli. The road wound round the mountains like a thread twisted about a sugar-loaf. We looked up, and said, "Oh, it is impossible that we can get there." We looked down, and said, "Have we really climbed so high?" And still we climbed higher and higher and higher. Everywhere were signs of cultivation; and it was quite touching to see how laborious, and often ineffectual was the system of it.

Contributions to the Flora of Mentone. Parts I. and II. By J. Traherne Moggridge. London: Reeve and Co.

Mr. Traherne Moggridge, with the assistance of M. Ardonio (who is preparing a flora of the Alpes Maritime) has produced two parts of an illustrated work on the flora of Mentone, each part containing twenty-five beautifully executed coloured illustrations, artistic and very true to nature. In the letterpress which accompanies them the characters of the plants are given, with references to authors, and able comments of his own.

The following works likely to interest our readers have appeared during the past few weeks:—

A Dictionary of British Birds. Reprinted from Montagu's *Ornithological Dictionary*, with additions. Compiled and edited by Edward Newman, F.L.S., editor of the *Zoologist.* Van Voorst.

Occasional Essays. By Chas. Wren Hoskyns, author of "Talpa; or, the Chronicles of a Clay Farm," "Inquiry into the History of Agriculture," &c. Longmans, Green, and Go.

The States of the River Plate; their Industries and Commerce. By Wilfred Latham. Longmans and Co.

On the Jostedal-Bræ Glaciers in Norway; with some General Remarks, and a Plate. By C. M. Doughty. Stanford.

A Naturalist's Ramble to the Orcades. By A. W. Crichton, B.A. Van Voorst.

Lectures on Animal Chemistry, delivered at the Royal College of Physicians. By William Odling, M.B. Longmans and Co.

Le Jardin Frutier du Muséum, ou Iconographie de toutes les Espèces et Variétés d'Arbres Fruitiers cultivés dans cet Etablissement, avec leur Description leur Histoire leur Synonymie, &c. Par J. Decaisne, Membre de l'Institut, Professeur de Culture au Muséum d'Histoire Naturelle. Paris: Firmin Didot and Co.

The Sea and its Living Wonders. A Popular Account of the Marvels of the Deep. By Dr. G. Hartwig. Third Edition, Considerably Enlarged and Improved. (Longmans.)

The Tropical Resident at Home. Letters addressed to Europeans returning from India and the Colonies on Subjects connected with their Health and General Welfare. By Edward J. Waring, M.D. (Churchill & Sons.)

Lessons in Elementary Physiology. By Thomas H. Huxley, LL.D., F.R.S. (Macmillan and Co.)

Buckmaster's Elements of Animal Physiology. By John Angell. (Longmans & Co.)

Correspondence.

[*Under this head we shall be glad to insert any letters of general interest.*]

WHAT ARE SHOOTING STARS.

SIR,—I was an admiring beholder of the November meteors, and I read with interest the various accounts of other observers given in the public prints. The precision with which our astronomers calculated the visitation of these vagrant lights does them infinite credit. But having seen, I wish to know more about them. The spectrum analysis does not in this instance appear to have seconded the endeavours of our scientific men to discover the composition of the celestial fireworks. Whatever they may be, I do not believe in the cloud of stones revolving round the sun, in which our earth periodically becomes involved. If these meteors were stones which became incandescent in consequence of the friction produced by their being projected through our atmosphere at an amazing velocity, surely some of them would come to earth. We have many authentic accounts of isolated meteors which have burst or exploded with a loud report, and the fragments have been seen to fall and plough up the ground. These are well known as aerolites. That none of the November meteors fell to the earth I think proves satisfactorily that they are not stones in the ordinary acceptation of the word; but I see no reason why they should not be composed of some phosphorescent substance which becomes ignited either by friction or contact with our atmosphere, and is entirely consumed during its brief visible existence.

I offer this merely as a suggestion, hoping that some one more learned in the stars will take up the subject in the NATURALIST'S NOTE BOOK. I am, Sir, yours, &c.,

A COUNTRY RECTOR.

TO CORRESPONDENTS.

The Curiosity Hunter (Leeds)—Please specify the receipts you require. We shall be glad to introduce an exchange column if desired.

J. W. S. (Hastings)—Woodward's Manual of the Mollusca will suit you. Messrs. Virtue, Ivy Lane, have just published a new edition at 5s. 6d.

W. Crisp (Holloway)—Mr. Stevens, King Street, Covent Garden, sells such things every Friday. By watching his sales you will probably get what you want at a low figure.

C. R. (Maldon)—Wood's Natural History is published by Routledge, in 3 volumes, at 18s. each.

Short Notes.

ABYSSINIANS.—The people of Abyssinia possess in their own land all the necessaries, and many of the luxuries of life in profusion; they have great freedom of speech and action, and they are constitutionally and systematically gay. They meet misfortune and death with perfect fortitude; they are not violent or emotional; when it suits their interests or convenience to commit what we should consider very serious crimes, they go and do it, and tell all the particulars with good-humoured laughter. It is difficult to our minds to realise all the influences and results of a social system in which neither crime, detection, or punishment is recognised as disgraceful, in which, in fact, there is no such thing as disgrace, and consequently no susceptibility, sensitiveness, or shame; but if we could succeed in realising these influences and results, we should understand the people over whom King Theodore assumed his sway, and the wonderful work he is doing. They are sensible, witty, superstitious, dirty, proud, litigious, intensely obstinate, and singularly averse to new ideas. The Jewish origin of many of their institutions is unmistakable, and several of their characteristics are strongly Jewish. They have a written language, but they never use it; all affairs are transacted verbally; in the rare case of a letter being written, it is neither signed, sealed, nor dated. Marriage is a civil contract, dissolved at pleasure, and no distinction is made, in station or provision, between legitimate and illegitimate children. The ties of relationship are strong, from interested motives, as a barrier to the exactions of rapacious governors, and the violence of the soldiery. They do not carry their sentiments to the practical point of sharing their means; on the contrary, incessant lawsuits are carried on between relatives, for land and property; and they will muster in thousands to bewail and avenge the death of one whom they would cheerfully have permitted to starve.—*Chambers's Journal*, Nov. 17.

BORAGE.—Borage is a rough plant, with fusiform roots, oblong or lanceolate leaves, and blue panicled or drooping flowers. The plant came originally from Aleppo, but is now naturalised in most parts of Europe and America. It is frequently found on dunghills and heaps of rubbish. Parkinson, who died about 1640, states that it grew plentifully in Kent in his day. Borage was formerly in great request, being reckoned one of the four cordial flowers. "Very light," says an ingenious author, "were those sorrows which could be driven away by Borage." Yet Borage flowers are at least innocent, which is more than can be said of many other general remedies for care. The whole herb is very succulent, and very mucilaginous, having a peculiar faint smell when bruised. The plant is now seldom taken inwardly. The young tender leaves may be used as a salad, or as a pot herb. The flowers are one of the chief constituents in the composition of a cool tankard. Borage is a pretty annual, and is raised from seeds, and in order to have it young all the year, it should be sown in spring, summer, and autumn, either in drills, or broadcast, from March to May. When the plants come up thick, they must be thinned to nine inches asunder. They will not bear transplanting, in consequence of the length of their tap roots: at all events, if the operation be attempted, it must be done when the plants are very young. It sows itself in autumn, and likes a dry soil. Borage ought to be cultivated in the vicinity of every apiary, as it is a plant to which the bees resort with great avidity, it being excessively rich in honey.—*Journal of Agriculture, N. S.*

DO BIRDS OF PASSAGE STEER BY THE SUN?—Sir, to this question by "Philornis" a decided negative must be the answer, for it appears that migration is chiefly performed by night. When the season arrives for their departure, our various small migratory birds, as observed in confinement, become restless after dark, fluttering their wings, pointing the beak upwards, and frequently springing up to the roof of their cage, to the injury of their plumage if this be not carefully provided against. They continue to evince this restlessness for some weeks; and I have known it, in one instance of a blackcap (*Sylvia atricapilla*), to be manifested throughout the winter, till in spring the bird has fairly worn itself out and died, though it had been caged for three or four years. The most curious fact is, that the same birds return, year after year, to the same haunts, and the young to the place of their nativity. A lame redstart was observed to return for eleven successive seasons to the same garden. Nightingales reared from the nest are found not to sing like wild birds of the species, but to pick up a medley of notes, mixing up whatever they may chance to have heard. A bird of this sort was turned loose by Mr. Sweet, a well known writer on cage-birds, in the course of the autumn, and returned the next season to his garden, being at once recognised by his peculiar song. Other instances might be adduced. How a bird that migrates by night should thus be guided in its course is a mystery seemingly beyond explanation; and equally the means by which other animals have been known to find their way home from vast distances, of which so many anecdotes are recorded.—B.—*Land and Water*, Dec. 1st.

THE LOTUS.—Drawings, both of the flower and the fruit of the Nelumbium, appear upon the ancient coins, mosaics, and monuments of the countries in which it was either indigenous or cultivated, often with ears of corn interspersed, then to form the insignia of Isis. Notices of it occur repeatedly in oriental poetry and legend, and, doubtless, it was some wandering Indian tale that gave origin to that beautiful fable in

Ovid, where he recounts the metamorphosis of the nymph Lotis, in the flower which, he tells us, "in the water preserves her name." To see as I have done, that glorious Chatsworth plant, not alone in the brightness of day, but lost in the sweet mystery of September moonlight, which disclosed, at the same moment, the green islands made by the floating leaf-trays of the Victoria, with, in the centre, a livid miracle of floral sculpture, white and rose-colour, like alabaster; and tall Papyrus stalks, bearing at top great green globes of bending hair; and broad leaves and lustrous bloom of many another princely exile from the far east, all, as it were, asleep, like the water, in the fragrant and luminous stillness—to see that glorious Chatsworth plant, I say, as then, was enough to re-invest it with all the ancient sanctity, and to make one feel how deep and reverent was that ancient flower-worship, and that if *this* were the plant that charmed Ulysses' ancient mariners, well might they "no longer wish to return, but prefer to remain in that country, and with the lotus for ever."—*Leo H. Grindon, in Country Words.*

PERUVIAN SILVER MINES.—Silver and gold are extracted in various places in Peru; but the only mines of importance are the silver mines of Pasco. Silver sometimes is found in native state, but most often in sulphides of silver, in argentiferous pyrites, carbonates and sulphates of copper. The processes made use of at Pasco are primitive; the wet ore is crushed by means of machinery put in motion by water power. From thence it is placed on the circo, basins of masonry within low walls. It is mixed with 10 to 11 per cent. of sea salt and turned with a shovel, and horses or mules are driven round upon it for several hours; quicksilver is then added and afterwards lime. This mixture is allowed to rest for two or three months, then it is put into bags, and an amalgam of silver and mercury is obtained free from any foreign matter. The amalgam is enclosed in large earthern jars, at the mouth of which a gun barrel or iron tube is fixed, that leads to a vessel full of water for condensing the quicksilver. It is then heated, the mercury evaporates, and the silver remains. A great loss is caused by this rough process; 75 per cent. of the mercury employed disappears. The slowness of this process, the loss that it causes, the scarcity of labour, all these have greatly diminished the working of the Pasco mines, and Peru scarcely yields annually gold and silver to the value of six million piastres.—*Journal of Society of Arts*, Dec. 7.

PLANTS OF ANCIENT EGYPT.—Professor Unger, in a paper communicated to the Imperial Academy of Sciences at Vienna, shows that Egyptian bricks contain a variety of evidence, preserved, as it seems, in an imperishable form. He has examined a brick from the pyramid of Dashour, which dates from between 3400 and 3300 B.C., and found imbedded among the Nile mud or slime, chopped straw, and sand, of which it is composed, remains of vegetable and animal forms, and of the manufacturing arts, entirely unchanged. So perfectly, indeed, have they been preserved in the compact substance of the brick, that he experienced but little or no difficulty in identifying them. By this discovery Prof. Unger makes us acquainted with wild and cultivated plants which were growing in the pyramid-building days; with freshwater shells, fishes, remains of insects, and so forth, and a swarm of organic bodies, which, for the most part, are represented without alteration in Egypt at the present time. Besides two sorts of grain—wheat and barley—he found Teff (Eragrostis abyssinica), the Field Pea (Pisum arvense), the common Flax (Linum usitatissimum), the latter having, in all probability, been cultivated as an article of food, as well as for spinning. The weeds are of the familiar kinds—Wild Radish (Raphanus Raphanistrum), Corn Chrysanthemum (Chrysanthemum segetum), Wartwort (Euphorbia helioscopia), Nettle-leaved Goosefoot (Cheriopodium murale), Bearded Hare's-ear (Bupleurum aristatum), and the common Vetch (Vicia sativa). The relics of manufacturing art consist of fragments of burnt tiles, of pottery, and a small piece of twine, spun of flax and sheep's wool, significant of the advance which civilisation had made more than 5,000 years ago. The presence of the chopped straw confirms the account of brickmaking as given in Exodus and by Herodotus.—*Journal of Botany.*

LIGHT OF THE SUN.—Let me say something now of the *light* of the sun. The means we have of measuring the intensity of light are not nearly so exact as in the case of heat; but this at least we know, that the most intense lights we can produce artificially are as nothing compared *surface for surface* with the sun. The most brilliant and beautiful light which can be artificially produced is that of a ball of quicklime kept violently hot by a flame of mixed ignited oxygen and hydrogen gases playing on its surface. Such a ball, if brought near enough to appear of the same size as the sun does, can no more be looked at without hurt than the sun; but if it be held between the eye and the sun, and *both* so enfeebled by a dark glass as to allow of their being looked at together, it appears as a black spot on the sun, or as the black outline of the moon in an eclipse, seen thrown upon it. It has been ascertained by experiments, which I cannot now describe, that the brightness, the intrinsic splendour, of the surface of such a lime-ball is only 146th part of that of the sun's surface. That is to say, that the sun gives out as much light as 146 balls of quicklime *each the size of the sun*, and each heated *all over its surface* in the way I have described, which is the most intense heat we can raise, and in which platina melts like lead.—*Sir John Herschell's Familiar Lectures.*

THE MAPLE IN CANADA.—The tree which specially attracts the stranger's attention, from the beauty of its form as well as of its foliage—the maple tree—is also a source of wealth to the farmer, and every farm of any consequence has attached to it its "sugar-bush." My attention was first attracted to the maple tree by seeing a bucket attached to one of them about three feet from the ground; upon inquiry, I learned that it was for the purpose of catching the juice as it flowed from the tree, and from which a very excellent sugar is manufactured. The operations usually commence in the latter end of March, when the great cold has disappeared, and the sap commences to ascend the tree. A hole is bored about 1 in. in depth, with $\frac{3}{4}$-inch augur, some 3ft. or 4ft. from the ground, a little tin spout is put in, and a bucket suspended from a nail above receives the sap as it falls. The sap, when collected, is taken to the sugar-house and boiled down to a proper consistency, which is ascertained by taking a birch twig and twisting it together so as to leave a hole about the size of a shilling; this is dipped into the boiling sap, and if upon being taken up and blown through the sap will fly away in particles like feathers, the sugar is done; but should the sap, on the contrary, fall to the ground in a thick heavy substance, the boiling must be continued. When properly boiled, and allowed to get cold, it becomes crystallised, and is used for various household purposes. In its liquid state it has the appearance of molasses, and is used like honey. This season I heard one farmer made over 1,300 lb. of maple sugar, which was worth a York shilling (7½.) per lb. The whole operation is over about the middle or end of April, as the sap ceases to run when the buds begin to form. —*Land and Water*, Nov. 10th.

RAISING FERNS FROM SPORES.—Half fill a pot or pan with pieces of broken pots, and fill to the rim with peat two-thirds, and loam one-third, adding one-sixth of silver sand. Make the surface smooth and firm, and give a good watering. Whilst wet scatter the powder or spores of the Fern over the surface; or, holding a frond with ripe spore-cases over the pot, rub the hand against the back or under side of the frond, and the yellow or brown powder-like spores will settle upon the surface of the soil. Gently pat the surface with the hand and cover the pot with a bell-glass, its rim fitting exactly within the rim of the pot and resting on its soil. Place the pot in a saucer, and fill the latter with water, always keeping it full, and put all in a house with a temperature of from 60° to 65°, the house being shadowed from bright sun, or if not, a paper cap made to fit on the upper part of the glass, and put on during bright sun, will answer every purpose of shade. The surface of the soil must always be kept moist, and the glass should be kept on closely until the soil becomes green; then tilt the glass a little on one side by night, and increase the amount of air by day, and as the surface becomes more green. Continue the bell-glass over the pot until the plants have formed two or three fronds, and then gradually harden off and pot the seedlings when large enough to handle, keeping them moist and carefully shaded.—*Journal of Horticulture*, Nov. 24.

THE DIONŒA MUSCIPULA is originally from South America. Its leaves, which are spread out on the soil near the roots, are composed of two parts, the one elongated, which may be considered as a sort of petiole, the other, larger and broader, and nearly circular, formed like two trap-nets, which are united at the base by a nervure, fashioned like a hinge, and furnished round the edge with rough hairy cells in the upper surface, these plates are furnished with certain small glands, whence exudes a viscous liquid which attracts the insects. If a fly lights on this singular apparatus the trap raises itself quickly by means of its long hinge. They approach and it closes rapidly, crossing its long cilia, and the insect is a prisoner. The efforts of the fly to escape increases the irritability of the plant, whose fangs only open when the movements of the animal have ceased with its life.—*The Vegetable World by Louis Figuier.*

KEEPING POULTRY IN LONDON.—I know there are some people who say this is impossible, but I have done so for two years and wish to state my experience. Having formerly lived in the country, and having there been a poultry fancier, when I came to London I naturally had the desire to keep my old friends—fowls. Now, I have a garden which is about 120 feet long and 40 broad, and at the bottom of it I have put up a fowl-house, a good-sized court, in which I keep half a dozen hens and a cock. They have for about five months of the year the run of the garden, but are shut up in the court during the remaining months. In looking over my accounts I find I have suffered no pecuniary loss by them, for taking the eggs at London prices I find I have gained 2s. 6d. I have found out that one breed does not thrive in London, and so have adopted a cross between Dorkings and barndoor fowls.

The following is the number of eggs laid by the six hens in the year:—

January	24	August	30
February	70	September	3
March	47	October	0
April	62	November	3
May	94	December	16
June	65		
July	34	Total	448

Journal of Horticulture, Nov. 3.

ELECTRICAL FOGS.—Sudden changes sometimes take place in the electrical conditions of fogs. A remarkable instance of this is mentioned by Mr. Crosse. One day, while there was a dense driving fog from the south-west he repeatedly tested his atmospheric exploring wire without detecting any electricity. "But all at once," he says, "about four o'clock, I suddenly heard a very strong explosion between the receiving-ball and the ball connected with the atmospheric conductor, the two being an inch apart. Shortly the sparks became one uninterrupted stream of explosions, which died away, and then immediately recommenced with the opposite electricity. The stream of fire was too vivid to look at for any length of time, and the effect was most splendid, continuing for five hours, when it suddenly ceased. . . . The least contact with the conductor would have occasioned instant death, and in every acre of fog there was enough of accumulated electricity to have destroyed every animal within that acre."—*Land and Water*, Nov. 24.

THE FUCHSIA IN VALENTIA.—Friends who have lately visited me here (Valentia, South of Ireland) encouraged my conceit about the size of my fuchsias. I have just mentioned one plant of Riccartoni which was planted in the year 1854, on a sloping grass bank in my flower garden. It measures just 90 feet in circumference, taken round the extremities of the branches. It would certainly have measured 8 or 10 feet more if it had not been cut away, to prevent it from encroaching on a gravel walk. The garden slopes to the sea with an easterly aspect. The plant in question stands 10 or 12 yards from the edge of the sea bank. It is estimated to stand 16 or 18 feet high, but of this I cannot be positive. There never has been anything done for this fuchsia, either in the way of protection or of manuring, since the day it was planted. —*T. Fitzgerald, Knight of Kerry, in the "Journal of Agriculture."*

THE WATER BLACKBIRD.—There is a little bird inhabits the shores of the lake, and feeds at the bottom ; the inhabitants call it Aderyn du cwr ; in English, "water blackbird" (Turdus cinclus, Linn. ; Cinclus aquaticus, Macg.) The feathers are jet black, except the breast, which is as white as snow. It is a trifle larger than a sparrow, and makes a similar noise. As I stood on the bridge that crossed over the Dee, looking at the waters rushing from the lake to the river (the Dee runs through the lake, and the inhabitants of the neighbourhood tried to persuade me that the waters do not mix, and they pointed out the rapid current in the middle), the bird flew from a bush and sat upon a stone, the top of which was just out of the water. I thought it had taken a very dangerous position, and must get washed off, but in a minute he walked off the stone into the water, and ran along on the bottom as if trying to commit suicide. I ran to the other side of the bridge to see him come under. He kept under water about half a minute, just coming to the surface and then dipping under again. He travelled with the stream, and would travel about twenty yards at a time. I watched this little creature for at least 150 yards down the river ; its white breast made it visible such a distance.—*Gardeners' Mag.*, Nov. 24.

GREAT ALOE TREE.—To observe its character more closely I turned aside towards the largest tree, and to my astonishment saw that it was in reality a gigantic Aloe. Kneeling down so as to bring my arms low enough to embrace the solid trunk I found the circumference to be nearly twelve feet. Above this it divided into five stems, each of which about four feet higher was subdivided into four or five more, and from these arose branches nearly as thick as my arm, and of uniform size even to the very top, where each was crowned by the star of Aloe leaves, short, thick, tapering to a finely hardened point, and curving gracefully upward, and each surmounted by three or more magnificent spikes of yellow flowers showing with more than golden lustre above the fresh green of the succulent leaves. The stems were smooth, round, and externally of a light cream colour ; upon the smaller branches, immediately below the leaves, thin annular flakes, easily detachable, marked, I suppose, the position of those that had been most lately shed, and near the base of the main trunk the bark seemed to burst and curl off as if very thin veneers of fine satin wood had warped off the foundation they were laid upon. The effect of this magnificent crown of leaves and flowers, more than fifteen feet from the ground and twenty in diameter, growing from sterile ridges of rough red rock, strewed with many coloured pebbles and quartz crystals in flashing back, like diamonds, the intense sunlight, was lovely in the extreme.—*Nature and Art*, Dec. (Accompanying the above is a beautiful Chromo-lithograph of the tree.)

THE LITTLE BITTERN.—On the continent of Europe the little bittern is a bird of passage, but the direction of its migrations has not been clearly made out ; the accepted theory of migration would make it go northwards to breed in May, and southwards in August and September ; but there is an absolute absence of observation to prove this to be the case. On the contrary, the theory of a lateral migration, from east to west in spring, and from west to east in autumn, seems to have some support from facts ; but the bird appears to move only in the night, and on the continent of Europe to take the course of the great rivers. In May and September it is most abundant in Holland, and is of frequent occurrence in Central Germany. It is particularly abundant in the marshes of Essone, near Paris, in September, and it is said that if a gun be fired the whole valley re-echoes for many minutes with the cries both of the old and young birds. It occurs in the same locality in May ; it stands on the tufts of carex and aira, waiting motionless for the appearance of its prey, which is said to consist entirely of small fishes. I cannot find a single record of its breeding in these marshes ; it come no one knows whence, and returns no one knows whither. It therefore seems highly probable that some individuals during their migratory movements should be observed in the southern counties of England, both going to and returning from their breeding places.—*Field*, Nov. 17.

WHAT RIVERS ARE DOING. — What the sea is doing the rivers are helping it to do. Look at the sand-banks at the mouth of the Thames. What are they but the materials of our island carried out to sea by the stream ? The Ganges carries away from the soil of India, and delivers into the sea, twice as much solid substance *weekly* as is contained in the Great Pyramid of Egypt. The Irawaddy sweeps off from Burmah 62 cubic feet of earth in every second of time on an average, and there are 86,400 seconds in every day, and 365 days in every year ; and so on for the other rivers. What has become of all that great bed of chalk which once covered all the weald of Kent, and formed a continuous mass from Ramsgate and Dover to Beechy Head, running inland to Madamscourt Hill and Seven Oaks ? All clean gone, and swept out into the bosom of the Atlantic, and there forming other chalk-beds. Now, Geology assures us, on the most conclusive and undeniable evidence, that ALL our present land, all our continents and islands, have been formed in this way out of the ruins of former ones. The old ones which existed at the beginning of things have all perished, and what we now stand upon has most assuredly been, at one time or other, perhaps many times, the bottom of the sea.—*Herschell's Familiar Lectures.*

MINERALS IN PLANTS. — So undetermined are the three great kingdoms of Nature, that animal existence cannot in many instances be altogether distinguished from vegetable nor vegetable from mineral. There is for examble a medicine very popular in the East named Tabasheer, which is extracted from the stems of the bamboo, and has been ascertained by analysis to be flint. In the same plants crystals have been discovered as hard as the diamond. Flint is contained also in the cuticle of straw, and on the leaves of the Deutzia it crystallizes in beautiful star-like points. Oxalate of lime is found in the roots of the garden rhubard and in all the species of Cactuses. Corallines and various marine lichens are in a manner petrified by the diffusion throughout their tissues of carbonite of lime, which on being dissolved out by means of acid leaves the vegetable texture of those orders clearly defined.—*The Key to the Universe.*

GRANITE.—Granite is the hardest of our native stones, and as a natural consequence, the most lasting. The Egyptian monuments formed of it, show no signs of decay after a lapse of three thousand years. The same cause has contributed in no small measure to the preservation of the old way-side crosses which so frequently meet the traveller in Cornwall. Should felspar, however, predominate, there is danger of its soon crumbling to pieces; in fact, the more felspar the less durable is the block. If pyrites or iron occur in granite they disqualify it for building purposes, as they form centres of decay under the influence of weather. After it has been quarried for some time it becomes refractory to work; and when intended to be used in the manufacture of ornamental objects, it is usual to keep it under water to soften it. The mode of extracting it from the quarry is by an iron bar tipped with steel, called a *jumper.* It is also split out in masses along the line of fracture by boring holes and inserting wedges. Owing to the demand for granite it becomes an important source of revenue to the districts formed of it. Thus the famous Peterhead quarries in Aberdeenshire give employment to some 500 workmen and 50 horses, and about 50,000 tons per annum are extracted. Although they had been worked for two centuries and a-half, much granite had never been quarried until 1741, when a large fire at Aberdeen elicited a municipal order that the fronts of the houses should be built of stone instead of wood, as hitherto.—*Once a Week*, Nov. 17.

TERRIER DOG.—A Staffordshire gentleman used to come twice a year to town on horseback, accompanied by his terrier; but, for fear of losing it in the metropolis, he always left it in the care of his landlady, at St. Albans. Once, however, the house-dog of the inn and the terrier guest having a quarrel, the latter was so much overmatched that it was with difficulty he could crawl out of the yard, and for a week no one knew what was become of him. He then returned, and brought with him a larger dog than that by which he had been beaten; when both of them fell on the former victor, and bit him most unmercifully, leaving him half dead. The terrier and his friend again disappeared; and as all this happened while the gentleman was in London, when he called on his way home at St. Albans, he had the mortification to hear the above particulars, and gave up his dog for lost. On arriving at his home, however, he found his terrier safe; and, on inquiry into the circumstances, was informed that he had returned upon his being first missed at St. Albans, and had coaxed away the great house-dog; with which he proceeded to avenge the injuries he had received, and then came home in quiet with his companion.—*Notes and Queries.* Nov. 10th.

A LARGE VINE.—This vine, which is growing at Kinnell, in Perthshire, is described as being 36 years old, and fills a lean-to vinery, which is 89 feet long from east to west, and has a perpendicular front elevation of 5 ft., and a sloping roof of 18¼ ft., equal to about 229 superficial yards of glazed surface. It covers the whole house, and its stem before branching off is 6 feet long by 16 inches in circumference. It is in healthy vigorous growth, produces highly-coloured fruit of sufficient excellence to carry of first prizes, and has for the last four seasons borne an average crop of about 600 bunches.—*Gardeners' Chronicle*, Dec. 1.

HABITS OF THE HEDGEHOG.—Let me give you an instance of the agility and appetite of a hedgehog. On Monday last I saw a young one (the size of a rat) eating ravenously of the Indian corn that I had strewn for my pheasants in front of my house. After watching it eating for some time, I turned my poodle dog out to see what he thought of him. After a little time I brought him in again, and the hedgehog made away at a rapid pace. Within half an hour after that, and close by, I found him actively engaged in eating a young rat (about double the size of a large mouse.) I touched him with my stick, and at once he rolled himself up, but retained his hold of the rat. I took it from him, and felt that it was warm and just killed. I then threw it down beside him and left. Shortly after I returned, and found that he had eaten all but the tail and hind legs. Next morning there was not a vestige left. How did he succeed in catching so agile a thing as a young rat?—QUAIL.—*Field*, Nov. 10.

THE CAT.—The cat was worshipped in Egypt as a symbol of the moon, not only because more active at night, but from the priests conceiving that the contraction and dilitation of the eye afforded an emblem of the increase and decrease of the moon's ever-changing orb. In the British Museum may be seen several figures of the cat-headed Goddess Pasht, under which name the moon was worshipped by the Egyptians, Pasht signifying the face of the moon. Pasht is compounded of the consonants P, SH, T; T is the Coptic feminine article, which, being omitted, the name is reduced to P,SH, but the aspirate SH, should be the tenuis S. and then the word would be P S, as in Hebrew, which may be pronounced "Pas" or "Pus" (Puss). It thus appears that our familiar name for the cat can boast of a very high antiquity.—*London Review*, Nov. 24.

PHOSPHORESCENCE OF THE SEA.—The cause of the phosphorescence of the sea has long occupied the sagacity of our savans. In the opinion of Dr. Yvan and others, it is caused solely by the molluscs swimming in the water, and more especially by microscopic molluscs. "Every time," says the doctor, in a new work, "I threw a net into the water, I withdrew it full of biphores, berocs, and medusæ. In one single drop I discovered myriads of small beings moving rapidly about, and at every contraction of these animalculæ the emission of light became more intense; so that it may be supposed that their muscular movements develop certain electric properties of which the action is extremely visible. Besides, it is so with the larger ones. I had placed in a glass vase some gigantic biphores; I saw them alternately rise and fall in the water, and all their movements were accompanied by a jet of fire, which increased the luminous intensity of the liquid fourfold."—*Queen*, Nov. 10.

ORANGE FLOWERS, A BRIDE'S DECORATION.—The orange blossom was adopted as an emblem of fruitfulness. Formerly this was considered a good quality in a wife, but one scarcely appreciated in these days. I have a note that the use of orange flowers at weddings is derived from the Saracens, amongst whom they were emblems of a prosperous marriage; and this is partly to be accounted for by the fact that orange trees in the east bear, I believe, ripe fruit and blossom, on the same tree at the same time.—*Notes and Queries*, Nov. 10.

RABBIT BREEDING.—Having read the different opinions of people as to whether tame rabbits would pay for breeding on a large scale, I can say, from great experience, that with good management they will pay much better than sheep; for instance, 800 breeding does, with their young, will consume upon an average about the same quantity of food during the year as 100 ewes and their lambs. The first outlay for purchase of stock: 100 ewes at 50s., £250; does, 800 at 2s. 6d., £100. The produce of the ewes during the year, say 100 lambs and wool, £250; the produce of the does at three months old would fetch in the London market during the same period at least £1000. I have now 150 does; stock, including young and old, about 1000. Any gentleman wishing to see them can do so. Address, "H. R., Post-office, Kingsclere, Hants."—H. BUCKERIDGE.—*Field*, Nov. 10.

AFRICAN ANTS. — The Scientific journal *Cosmos* has some remarks upon ants. This paper says it has often been asked what these insects are good for, especially the termites, which are the terror of the inhabitants of the tropical countries? On the strength of the testimony of a traveller recently returned from Western Africa, *Cosmos* says that the equatorial regions would be uninhabitable were it not for the ants, who are constantly engaged in clearing away all putrescible matter; their number is incalculable, and their voracity prodigious. The hives which they construct for themselves are, according to this West African traveller, far superior in appearance to the huts of the Liberian negroes, in an architectural point of view; they are built in the shape of a pyramid, and sometimes are as high as 30 feet.—*Cosmos.*

BANYAN TREE.—The famous Banyan Tree on the Herbuddah is said, by the late professor Forbes, to have 300 large and 3,000 smaller roots,—ærial roots as they are sometimes called. It is capable of sheltering 3,000 men, and thus forms one of the marvels of the vegetable world.—*The Vegetable World by Louis Figuier.*

GARNETS IN GRANITE.—In the Museum of Practical Geology, Jermyn Street, is a series of 293 specimens of granite and its constituents. The true rock is here seen passing into all its schoralceous and porphyritic varieties. Amongst other curiosities is part of a granite boulder from the bank of the St. Lawrence, containing numerous garnets, and a specimen of granite with black mica. The felspar is here seen in process of decomposition, passing into *kaolin.* It is superfluous to recommend every geological student to visit this superb collection.—*Once a Week.*

CAMEO SHELLS.—The several varieties of the so-called conch shells (species of cassis and strombus) with which the stores of the Bahamas Islands abound, form an important article of export, and their collection affords a useful means of employment to the maritime and littoral population. They are chiefly sent to France. In the last three or four years the collection was somewhat interfered with by the more stirring trade carried on from Nassau during the American civil war, and the quantity shipped was reduced to one-half. From 1855 to 1860 the average value of the shells exported was upwards of £2,600, but from 1861 to 1865 the annual average was below £1000.—*Queen*, Nov. 10.

SAFFRON.—Saffron was one of the perfumes most in favour with the Romans. They not only had their apartments and banqueting-halls strewed with this plant, but they also composed with it unguents and essences which were highly praised. Some of the latter were often made to flow in small streams at their entertainments, or to descend in odorous dews over the public from the *velarium* forming the roof of the amphitheatre. Lucan, in his "Pharsalia," describing how the blood runs out of the veins of a person bitten by a serpent, says that it spouts out in the same manner as the sweet-smelling essence of Saffron issues from the limbs of a statue.—*Rimmell's Book of Perfumes.*

HORSE CHESNUT.—The etymology is not a settled mattter, but if you are disposed to investigate it, no doubt you will find it amusing. The horse shoe and nails are to be found at the foot of the leaf-stalk when it has just fallen, or when it can be detached by a mere touch. Probably many stalks bearing the insignia may be found under any chesnut tree now, though a month ago they should have been looked for. The articulation of the leaf-stalk to the stem is in a horse-shoe form, and when the stalk parts from the stem the fanciful nails are quite conspicuous. The leaf-stalk of the Ailanthus glandulosus is articulated in a similar manner, and also exhibits similar resemblances to the horse shoe and nails.—*Gardeners' Magazine*, Nov. 24.

AGATE MOUNTAIN.—The Reese River (California) *Reveille* says that about three miles north of Ione there is an isolated mountain, some 500ft. high, which is called Agate Mountain. Its entire surface upon all sides, from summit to base, is covered with agates and concretions, and on digging into the soil they are found like potatoes in a hill. The agates are usually oval and sometimes globular in form, and varying from 1in. to 4in. in diameter, and are beautifully banded and striped.—*Mechanics' Magazine*, Dec. 17.

FALL OF THE LEAF.—Several independent observers, among whom Dr. Inman, of Liverpool, is one, have arrived at the conclusion that the fall of the leaf is due to the formation of a layer of cells, arranged in a plane different from that of the rest of the tissues, thus gradually severing the leaf from its support, much as a knife-blade would do, and moreover serving as a thin skin to protect the surface of what would otherwise be an open wound.—*Gardeners' Chronicle*, Nov. 24.

Remarks, Queries, &c.

(*Under this head we shall be happy to insert original Remarks, Queries, &c.*)

FLOWER GARDEN.—All bulbs that have not already been planted should be put in the ground at once. Tulips kept from frost, if possible. Auriculas cleared of dead leaves and kept moist, taking care not to give too much water. Hyacinths in borders should be protected by matting or litter. Pinks and pansies covered with litter, but not sufficient to deprive of light and air. Cuttings should be taken of chrysanthemums and put into thumb-pots; those that are struck should be shifted. Plants in greenhouse or pits should be carefully protected from frost and seldom watered. Hedges should be cut and trimmed, and mended with new plants if requisite. Box-edgings and gravel-walks should be attended to, and all contemplated alterations made.

KITCHEN GARDEN.—Sow early dwarf peas in rows a yard apart; earth up any that are forward enough. Plant out cabbage in vacant spaces a foot apart in rows, eighteen inches from row to row. Autumn sown broad beans should be protected, and more early kinds sown in beds for transplanting. Cauliflowers under glass must be protected by extra covering. If mild and dry, hoeing and earthing-up round the stems of winter crops should be attended to. Earth up celery, and if very frosty protect with litter. Rhubarb or seakale may be forced by covering with a pot and surrounding with hot dung. Prune all fruit trees left undone. Plant trees, if any are wanted. Cut away old raspberry canes, and reduce the new ones. Repair the fastening of all climbing plants if necessary.

SOME GOOD ROSES.—*Crimson*—Senateur Vaisse, Louise Carique, Adolphe Noblet, Eugene Beauharnais. *Pink*—Baronne Prevost. *Yellow, buff, and white*—Solfaterra, Triomphe de Rennes, Gloire de Dijon, and Souvenir de Malmaison. For planting against a house or verandah. *South aspect*—Solfaterra, Gloire de Dijon, Triomphe de Rennes, Celine Forestier, all shades of yellow. *East and west*—General Jacqueminot, Senateur Vaisse, Jules Margotten, and Charles Lefebre, all shades of crimson, *North and exposed situations*—Paxton, Baronne Prevost, and Louise Carique, two first pink, the latter crimson. The cost from a large grower is, 1s. to 1s 6d. a plant.

HARDY BEDDING PLANTS.—A correspondent in the *Gardener's Chronicle* suggests substituting the hardy herbaceous and alpine plants in the place of geraniums, calceolarias, &c., so much used at present. Amongst others he names the following as well adapted—Viola cornuta, Achillea aurea, Polemonium cœruleum varigatum, Dactylis glomerata variegata, Sempervivium californicum, the silvery Saxifragas Gnaphaliums, and Cerastiums the new Poa, variegated Daisies, dwarf Autennaria tomentosa Tritomas, Cliveden pansies, Anemone japonica, and Rudbeckia neumanni.

DURING January the following birds sing:—Redbreast, missel thrush, hedge sparrow, great titmouse, thrush, wren, skylark, woodlark, chaffinch; and the blackbird whistles.

ROOKS come back to their nests. The house-sparrow and white wagtail chirps. Earth worms lie out. Ivy casts its leaves. Jackdaws frequent churches. Gnats play about. Insects swarm. Slugs, bees, chaffinches, bats, nettle butterflies, and yellow wagtails appear. Larks and linnets congregate. Spiders shoot their web. Nut-thatch is heard, and latter end of the month shell-snails appear.

THE following were noticed by White at Selborne to flower during the month:—Winter aconite, bear's-foot, polyanthus, double daisy, mezereon, pansy, red dead nettle, groundsel, hazel, hepatica, primrose, firze, wallflower, stock, black helibore, snowdrop, white dead nettle, trumpet honeysuckle, common creeping crow's-foot, dandelion, crocus, hazel, honeysuckle.

PLANTING CHURCHYARDS.—There has been some interesting correspondence in the *Gardener's Chronicle* during the past month about beautifying churchyards. A gentleman in the number for December 13th writes the following:—I beg to recommend for such places Cypress, Deodars, Irish Yew, Chinese Arbor-vitæ, Cedar of Lebanon, Weeping Ash, Weeping Willows, and variegated Hollies; and if trees which shed leaves are not objected to, Red Beech. For binding unsightly walls I would recommend Irish Ivy, and a still handsomer Ivy with broad and large polished leaves, called Hedera Rœgneriana. Cotoneaster, when in berry, is also good for the purpose and highly ornamental. The stoneless Barberry, so valuable for preserving, is likewise a very ornamental tree. I am likewise in favour of Roses, of which the following are strong growers and abundant bloomers, viz.:—*White:* Acidalie. *Yellow:* Gloire de Dijon. Triomphe de Rennes, and Céline Forestier. *Rose colour*: Anna Alexieff, Baronne Prevost, Souvenir de la Reine d'Angleterre, John Hopper, and Madame Clemence Joigneaux. *Salmon-rose:* W. Griffiths. *Silvery rose:* Cecile Chabrillant. *Dark crimson:* Charles Lefebvre, Duc de Cazes, and Vicomte Vigier. *Very dark crimson:* Prince Camille de Rohan and Empereur de Maroc. *Vermillion-red:* Duc de Rohan, and Maurice Bernardin. *Scarlet-crimson:* Senateur Vaisse. *Clear red:* Madame Louise Carique. *Purple-crimson:* Triomphe de Paris. *Blush:* Souvenir de la Malmaison. These are beautiful and very hardy. It is of no use to plant less hardy and less vigorous growers in exposed churchyards. They should be on the Manetti Stock. Briar Roses are unsightly objects.

GOOD STRAWBERRIES.—A correspondent of the *Journal of Horticulture* gives the following list of good strawberries for the market :—*For Early Crop.*—Princess William of Prussia is very early, a good bearer, but the fruit is rather small after the first picking, but it makes up for this by being about a fortnight earlier than any variety which we have. We grow this on the fruit borders for one-year croppers.—Alice Maud is our standard. General Havelock is a very good early variety, large, and hard ; to be grown in rows ; comes in about a week later than the last. We have a new kind called the Princess of Wales, which is earlier than Princess of Prussia I believe.—*Second Crop.*—Kitley's Goliath is an old standard variety, a good bearer and medium hard. Caroline Superba is a very good bearer, hard, and would be better with more colour. It will sell after the people know it. Sir Harry is a good bearer, and very large. It must be gathered before ripening when sent to a distance. Sir Charles Napier is very good but rather sharp. Myatt's Eliza is one of our best market strawberries. We sell it mostly for preserving. It is much better than Elton, of which we grow a few.—*Late Crop.*—Frogmore Late Pine is, as I have said before, everything that can be desired. Myatt's Eleanor is very good. It must have plenty of sun and air.

NOTICE.

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Page	4	0	0

STATE OF THE WEATHER NEAR LONDON.

Nov. and Dec.	Moon's Age.	BAROMETER.		TEMPERATURE.					Wind	Rain.	REMARKS.
				Of the Air.			of the Earth				
		Max.	Min.	Max	Min	Mean	1 foot deep	2 feet deep			
Thurs. 15	☽	30.121	29.788	56	43	49.5	50	49	S.W.	.02	Slight frost early A. M.; uniformly overcast; slight rain.
Friday 16	9	29.441	29.313	57	27	42.0	50	49	S.W.	.00	Overcast; cloudy and boisterous; slight frost at night.
Satur. 17	10	30.237	30.072	49	22	35.5	50	49	S.W.	.00	Clear, quite cloudless, and very fine; Barometer very unsteady for a week past.
Sunday 18	11	29.835	29.793	52	30	41.0	48½	48	S.	.14	Partially overcast; cloudy; overcast; slight frost; rain.
Mon. 19	12	29.960	29.837	54	23	38.5	48	48	N.W.	.00	Rather boisterous; fine; very fine; clear; frosty at night.
Tues. 20	13	30.117	29.960	45	19	32.0	47	48	N.W.	.00	Clear and frosty; very fine; cold wind; sharp frost at night.
Wed. 21	14	30.119	30.041	48	24	36.0	46	46½	N.W.	.00	Fine, clear with bright sunshine; very fine; frosty.
Thurs. 22	○	30.160	30.095	46	37	41.5	45	45	S.W.	.04	Light clouds and fine; overcast; rain at night.
Friday 23	16	29.893	29.644	50	30	40.0	45	45	W.	.01	Overcast; lightly overcast; fine, slight shower at night.
Satur. 24	17	29.885	29.712	49	39	44.0	46	45	N.W.	.01	Fine throughout; overcast; slight rain at night.
Sunday 25	18	29.516	29.427	53	30	41.5	46	45	W.	.00	Fine; cloudy; fine at night.
Mon. 26	19	29.939	29.803	49	36	42.5	46	45½	N.W.	.01	Cloudy; clear and fine; overcast at night.
Tues. 27	20	30.035	29.848	50	23	36.5	46½	45½	N.W.	.00	Overcast; clear, with a few white clouds; very fine; frosty.
Wed. 28	21	30.233	30.164	47	24	35.5	45½	45	W.	.00	Hoar frost; clear; cloudless and very fine; foggy; frosty.
Thurs. 29	☾	30.214	30.158	51	26	38.5	44½	45	W.	.00	Foggy; clear and very fine; overcast at night; slight frost.
Friday 30	23	30.092	29.885	45	30	37.5	45	44½	S.E.	.00	Light hazy clouds; clear, very fine.
Satur. 1	24	29.789	29.730	36	31	33.5	43½	43½	E.	.20	Overcast; cold uniform haze; overcast; rain.
Sunday 2	25	29.798	29.747	50	25	37·5	43½	43½	S.W.	.08	Hazy, with slight drizzle; overcast; rain at night; frost.
Mon. 3	26	29.788	29.703	55	48	51.5	44	43	S.W.	.10	Overcast; rain; drizzly; rain.
Tues. 4	27	29.693	29.669	56	50	53.0	45	45	S.W.	.14	Rain; overcast and boisterous; much vapour driven by warm S.W. wind.
Wed. 5	28	29.799	29.745	56	44	50.0	45½	46	S.W.	.48	Densely clouded; rain; rather boisterous and wet throughout.
Thurs. 6	29	29.854	29.529	57	45	51.0	45	45½	W.	.16	Rain through the day; boisterous at night.
Friday 7	●	29.717	29.458	51	29	40.5	46	47	W.	.00	Uniformly overcast; boisterous and showery; fine at night; slight frost.
Satur. 8	1	30.429	30.136	49	20	34.5	44	47	N.W.	.00	Clear and very fine, with bright sun; frosty at night.
Sunday 9	2	30.355	29.904	55	31	43.0	43½	46½	S.	.06	Uniformly overcast; overcast; rain at night.
Mon. 10	3	30.128	29.495	53	24	38.5	44	45½	N.W.	.02	Partially overcast; very fine; fine at night; frosty.
Tues. 11	4	29.230	29.152	52	28	40.0	45	45	S.E.	.02	Foggy; hazy; rain at night; slight frost.
Wed. 12	5	29.813	29.451	56	44	50.0	44	45	S.W.	.00	Densely clouded; cloudy and windy; overcast; heavy rain at night.

ON THE EARTH'S MOTION.

THE earth rotates on its axis and revolves in its orbit; and this twofold motion secures to it those alternations of light and darkness, as well as that succession of seasons, without which, organised as we are, our very existence would be impossible. That this beautiful combination of motions is not due to accident is proved by the admirable harmony which prevails throughout creation; by the wonderful adaptation of means to the end proposed, which is everywhere perceptible; by the skilful balance of antagonistic forces, so as to establish a constant equilibrium; and by the production of good from seeming confusion and evil.

The relations between the earth and sun are such that they would scarcely admit of any modifications compatible with those forms of animal and vegetable life that are known to us. If the earth had been left in a state of rest, how different would have been its condition from that which exists at present! If it did not revolve on its axis, or if, like the moon with regard to the earth, it always presented very nearly the same surface to the sun, on account of its diurnal and annual revolutions being performed in the same time, there would be no distinction between day and night, the happy alternations of which are so well adapted to those successive periods of exertion and repose that are a necessity of our nature. Changes of temperature, winds, and tides, which are indispensable to the purification of the atmosphere and the waters, could not occur. Half the earth's surface would be shrouded in perpetual darkness, and consigned to eternal cold; and half of it would be exposed, from the endless duration of its day, to a temperature such as neither animals nor plants could endure.

Any spontaneous change in the axis of the earth's rotation would be fatal to us; but such a change is rendered impossible by its revolving on its shortest axis. This is a necessary consequence of the laws by which it has been decreed by Providence that matter should be governed. Being at first, most probably, in a gaseous state, the earth assumed the spherical form, on account of the attraction of gravitation; and the centrifugal force generated by its revolution changed it into an oblate spheroid—that is, a spherical body flattened at the extremities of its axis of rotation, and bulged out at its equator.

The mere diurnal rotation of the earth would not suffice to render it capable of maintaining organised beings on any considerable portion of it. The days and nights would remain constantly equal in length; the solar rays would fall too obliquely, and for too short a period during each day, on a large part of its surface. It has been made, therefore, to revolve round the sun in a plane which makes an angle with the plane of its equator. This simple arrangement produces the most important results; for to it is due the constant succession of the seasons, with all the advantages we derive from them. By means of it the sun, during its *apparent* annual revolution, is found alternately north and south of the equator. The days are longer than the nights in that hemisphere in which it is; and, as it rises to a greater height above the horizon than it would have done were it to remain constantly over the equator, its rays descend less obliquely, and therefore a larger amount of them fall upon a given surface of that hemisphere. Both the length of the day and the sun's altitude increase as the distance from the equator increases—that is, the sun becomes, in other respects, less powerful. But, when the day is longer, there is more time for the sun's rays to accumulate, and less for them to pass off by radiation. Since the temperature of a place depends very much on the duration of its exposure to the sun's rays, the increasing length of the summer day, as either pole is approached, makes up to a great extent for unfavourable position with reference to the sun; and hence the hot summers which are found even in very high latitudes. If the obliquity of the ecliptic, that is, the angle its plane makes with the plane of the equator, were less than it is, the seasons would not be sufficiently varied; if it were greater than it is, there would be extremes of temperature incompatible with organic life.

That the earth's orbit should be an ellipse, and not a circle, is a consequence of the general law of gravitation. It has been supposed that this ellipticity causes some modifications in the relative temperatures of the northern and southern hemispheres; and the more severe cold experienced in high southern than in high northern latitudes has been ascribed to the sun being nearer to the earth during the northern than the southern winter.

This difference of temperature is, however, fully accounted for in another way. The climate of any place depends, not only on the number of solar rays which it receives, but on the relative amount of land and water, on altitude above the sea, on proximity to the ocean, &c. It makes a great difference, if, as is the case in the southern hemisphere, the surface consists of water, into which the heat rays penetrate, instead of being, as in the northern hemisphere, chiefly land, which reflects the heat rays into the atmosphere, so as to raise its temperature.

The elliptical form of the earth's orbit produces in reality no effect on the seasons; for the supply of heat to any place depends not only on the amount imparted to it in a given time, but on the length of time during which it continues to be received. Now the time during which the sun shines on any place is modified by the velocity of the earth in that part of its orbit in which it happens to be; because, as the earth's distance from the sun increases, its angular velocity diminishes; and thus the time during which the heat is communicated is increased, the injurious effect of the sun's augmented distance being exactly counterbalanced by the diminished velocity with which it travels through a given distance, and the resulting greater length of time during which its rays are received. This is a consequence of one of the laws discovered by Kepler. According to this law "the spaces described by a line joining the centres of the sun and the earth or any other planet, are equal in equal times," no change being caused by any alteration in the planet's position in its orbit, the angular velocity being least when the distance from the sun is greatest, and *vice versâ.* The rays of the sun, intercepted by the earth, in equal times, no matter where it may be in its orbit, are therefore always equal in quantity.

But for this admirable compensation the difference between summer and winter would be greatly augmented in the southern and lessened in the northern hemisphere, since the earth's distance from the sun fluctuates to the extent of nearly the one-fifteenth of its entire amount. The direct impression of the solar heat is, however, in the height of summer, under a perfectly clear sky at noon, greater in a southern than in a corresponding northern latitude; and hence the sufferings of travellers in the thirsty deserts of Australia are greater than in those of Africa.

The earth is retained in its orbit by two forces one of which—centripetal—prevents it from flying off into infinite space; and the other—centrifugal, which was originally that of projection—prevents it from being precipitated upon the sun. And, just as the former of these, during the earth's revolution in its orbit, is increased by the earth's approximation to the sun, the latter, which is required to counteract it, is increased also. Each becomes predominant alternately, but neither retains its superiority long enough to produce an injurious effect. The very velocity with which the earth, in one part of its orbit, rushes towards the sun, generates a force which carries it away from that body; and the velocity with which it flies from the sun is gradually lessened by centripetal force, until at length the latter becomes sufficiently powerful to turn it back again towards that luminary. If the direction and amount of the force with which the earth was first projected, so as to cause it to revolve round the sun, had been such as to produce an elliptical orbit of great eccentricity—that is, a very long and narrow ellipse—the earth, during part of its revolution in such an orbit, would be so far from the sun as to derive but little benefit from it.

The rotation of the earth on its axis is necessary to produce alternations of day and night; and the revolution of the earth round the sun, in an orbit oblique to the equator, is required for the changes of the seasons. Were the variation of this orbit from the circular form not compensated by a change of velocity depending on the mutual action of the centripetal and centrifugal forces, or were the obliquity of the ecliptic either greater or less than it is, we should be subjected to extremes of temperature which, if not fatal to our existence, would greatly affect our comfort.

Thus, in these, as in all other circumstances connected with this earth and whatever it contains, not only our preservation, but our happiness has been carefully provided for.—*The Scientific Review*, January, 1867.

THE MEXICAN AGAVE.

The American Aloe (*Agave americana*) is a native chiefly of Mexico, but it is found in other parts of America. The precise date of its introduction into this country is not known, but it is recorded that one flowered in Lambeth in 1698. It grew to a height of from 12 to 15 feet, and was considered very choice and rare. The plant appears to have flowered in Paris in 1663, and at Leipsic in 1700. In 1729, and again in 1743, two plants flowered at Hampton Court, it still being considered a great rarity.

There is a popular notion regarding the agave that it flowers but once in a hundred years. The plants cannot be said to flower more than once during their life, but this flowering period may be at any age, and is influenced by the soil and position in which they grow. After flowering the plants die, but new ones are produced by suckers. Though the agave itself is of comparatively slow growth, the flower spike, which shoots up from the centre of the tuft of leaves, on the contrary, grows very rapidly, gaining a height of from 20 to 30 or even 40 feet, from the upper portion of which small branches are given off, which are crowded with the yellowish-green flowers. At the base these flower spikes are nearly as thick as the wrist; the longest one ever recorded was 40 feet, and grew in the King of Prussia's garden. The flower spike which runs to this great height is a very striking object, being of a remarkably straight growth, and remaining in flower for several weeks; it contrasts favourably with the great fleshy, rigid leaves, which apparently spring from the ground without any stem intervening; these leaves sometimes grow to a length of 6 feet, and remain perfect for many years. Interspersed through the fleshy substance of these leaves is a large quantity of strong fibre, much used for a great variety of useful purposes in all countries where the plant grows. It makes excellent twine and cord of any thickness, and is exceedingly strong and of a very clean appearance; the fibres themselves are very regular and even. Hammocks are constantly made of this twine, and very strong and durable articles they are. The fibre has also been imported into this country of late years under the name of Mexican fibre, and it is much used in the manufacture of nail brushes, scrubbing brushes, and similar articles. Humboldt speaks of a bridge in Quito over the Chimbo, the span of which was upwards of 130 feet, and the principal ropes, which were four inches in diameter, were made of this fibre. It is separated from the fleshy part of the leaves by bruising them, then macerating them in water, and afterwards beating them. This fibre has also been used for paper making. Important as is this product of the plant, the most valued of all is the sap, which, when fermented is known as pulque in Mexico, where it is much used as a beverage.

There are three or four species of agave, all of which yield a vinous sap, but *A. americana* is the most important; of this, however there seems to be many varieties, for in a very lengthy report received at the Foreign Office from the consul at Mexico, upon the cultivation and uses of the plant, he says that as many as ten varieties yield neither juice nor fibre, and are consequently of no other use but for making hedges; he then enumerates twenty other varieties, each yielding juice in greater or less abundance, or of different degrees of quality.

The introduction of the use of pulque into Mexico is said to have been "between the years 1045 and 1050, in the reign of the eighth king of the Taltec tribe, named Tepancaltzin, at whose court a relation of his, named Pepantzin, presented himself, and informed him that his daughter had discovered that a sweet and aromatic liquid sprung forth from the Metl plants in her garden. The king ordered her into his presence, and she brought him a 'Tecometl,' or vase of the liquid she had discovered, which he tasted and then ordered her to bring him more; and subsequently becoming enamoured of the maiden, whose beauty was great, and whose name was Xochil, or 'flower,' he married her; of which union a child was born, to whom was given the name of Meconetzin, or 'son of the Metl,' or Maguey, in allusion to the circumstance which was the origin of his parents' first interview.

"Whether the discovery of the use of the juice of the Maguey be really attributable to the god Izquiticatl, or to the queen Xochil, there is no doubt that the divers properties of the plant itself were known many years before the discovery of Mexico by the Spaniards, for not only is it mentioned as furnishing thorny scourges as well as whips made of the fibres of the plant's leaves, for the multitudes who annually met to celebrate a festival in honour of the good Texcatlipuca, in the great Temple of Tenochtitlau (the modern Mexico), but the use of the juice became so general that many severe laws against the drunkenness resulting from it were issued by the ancient Mexican kings, mention being made of a widow who sold it promiscuously having been put to death by order of the king Netzahualcoqatl; only women suckling infants, old people, and soldiers upon the march, being allowed to drink it.

"To the various uses to which the Maguey plant was turned by the ancient Mexicans, and which were so much commented upon by the writers of the period, may be added that of making of paper from the skin of the leaves, many curious old documents still existing of that material, as well as the manufacture of a kind of soap from the root. As to the extent of the lands appropriated to the culture of the plant, the writers in question give scanty information, but still sufficient to show that it was cultivated on an extensive scale in various districts of Mexico, where the vassals paid a great part of their tribute money in clothes and sandals made of 'ixtli,' or Maguey fibre, and it is worthy of observation that the districts in question were the most thickly populated of the ancient Mexican territory, which is stated, perhaps somewhat vaguely, by the old Spanish writers to have contained more than thirty million inhabitants." —*Gardeners' Chron.*, Dec. 29.

THE GLACIAL OR NORTHERN DRIFT.

THIS is a layer of loose materials—gravel, clay, mud, pebbles, and angular stones, which is found spread at intervals all over Northern Europe, and is very common in the valleys and upland slopes of North Wales. It is very abundant all round the town of Dolgelly, where it forms undulating slopes, mounds, and hummocks in most of the valleys, filling up the space between the flat alluvial meadows on the river side and the steep rocky slopes of the adjacent mountains. Wherever this is cut through in making roads or railways, it is seen to be full of blocks of stone, pebbles, and large masses of rock distributed through it without any order or arrangement, the top, middle, and bottom being alike in composition. From the contour of the surrounding mountains, it can be often seen that this deposit is of great though very variable thickness, probably often exceeding a hundred feet, and it certainly covers many hundred square miles of country in North Wales alone. On ascending the mountains it is often found on their less precipitous slopes, and in the upland valleys at more than a thousand feet elevation, and it has even been traced around Snowdon, by Professor Ramsay, to a height of more than two thousand feet. The materials of which the drift is composed are various. Sometimes the rocks are nearly all those of surrounding mountains; at other times they are such as must have been brought from a great distance. The geological age of the drift is determined by its overlying all, even the most recent formations, and by its containing occasionally marine shells of an Arctic type, and of species which are all now living.

Here we have materials of a loose and miscellaneous nature, which were deposited *in* the sea, but not *by* the sea. That the drift was deposited in the sea is proved by the marine shells which have been found in it up to the height of 1,300 feet, on some mountains in Carnarvonshire; and we have thus a proof that North Wales, was, at a very recent epoch, sunk to at least that depth beneath the ocean. The presence of the drift itself, however, at a height of more than 2,000 feet would prove a much greater submergence. That the deposit could not have been made by the sea is shown by the want of arrangement of the materials, and the abundance of large angular fragments of rock. Water always sorts the materials it deposits. The rocks, the pebble, the shingle, the sand, the mud are carried different distances, and deposited in different places or in different layers. Water deposits are stratified. Neither can rocks be carried far by water and retain their angles and clean-fractured surfaces. They get rounded into boulders or pebbles, whereas many of the rocks and stones found in the drift are as sharp, angular, and irregular as the blocks and masses which are detached by the winter's frost, and lie under an inland precipice.

The solution of this curious problem of the origin of the drift is to be found in the history of glaciers and icebergs. When a valley is filled with ice the rocky *debris* from its slopes and precipices fall upon the surface of the glacier. A quantity of earth and stones of the bottom of the valley is also forced into the crevices, or frozen to the bottom of the icy mass. Now, when the ice-filled valley terminates in the sea, large fragments of the glacier break off and become icebergs, and floating away, carry with them their load of earth and rocks, which are, deposited where they melt, or topple over, or are stranded. In the North Atlantic, as far as icebergs float there must be an annual deposit of matter, on its bottom exactly of the same nature as the drift; while in Hudson's Bay and the gulf of St. Lawrence it must be accumulating still more rapidly. When North Wales was one or two thousand feet lower than at present, it must have formed a group of islands, among which icebergs would frequently become entangled, and deposit their loads of foreign matter. Bt the same time Snowdon and Cader Idris would have been sending down glaciers into the sea, which would spread the *debris* of their precipices and valley bottoms on what are now the upland slopes and low valleys, but which then were submerged banks and ocean straits. As the land rose above the sea to its present elevation, rivers, floods and glaciers would more or less furrow and clear away the drift from the valleys, and leave it distributed in the irregular manner in which we now find it. The mere presence, therefore, of this unstratified mass of earth, rocks, and boulders would of itself prove a recent glacial period, since it clearly indicates the existence of icebergs and glaciers in seas and countries where they are now never found.—*The Quarterly Journal of Science*, January. John Churchill.

COCKROACHES.

Of the "gentlemen of England who live at home at ease," very few, I suspect, would know a cockroach, although they found the animal in their soup—as I have done more than once. Cockroaches are of two principal kinds—the small, nearly an inch long; and the large, nearly two and a half inches. Let the reader fancy to himself a common horse-fly of our own country, half an inch in breadth, and of the length just stated, the body, ending in two forks, which project beyond the wings, the head, furnished with powerful mandibles, and two feelers, nearly four inches long, and the whole body of a dark-brown or gun-barrel colour, and he will have as good an idea as possible of the gigantic cockroach. The legs are of enormous size and strength, taking from fifteen to twenty ants to carry one away, and furnished with bristles, which pierce the skin in their passage over one's face; and this sensation, together with the horrid smell they emit, is generally sufficient to awaken a sleeper of moderate depth. On these legs the animal squats, walking with his elbows spread out like a practical agriculturist writing an amatory epistle to his lady-love, except when he raises the forepart of his body, which he does at times, in order the more conveniently to stare you in the face. He prefers walking at a slow and respectable pace; but if you threaten him by shaking your fist at him, or using opprobrious terms to him, it is very funny to see how quickly he takes the hint, and hurries off with all his might. What makes him seem more ridiculous is, that he does not appear to take into consideration the comparative length of your legs; he seems impressed with the idea that he can easily run away from you; indeed, I have no doubt he would do so from a greyhound. The creature is possessed of large eyes; and there is a funny expression of conscious guilt and impudence about his angular face which is very amusing; he knows very well that he lives under a ban—that, in fact, existence is a thing he has no business or lawful right with, and consequently he can never look you straight in the face, like an honest fly or moth. The eggs, which are nearly half an inch long, and about one-eighth in breadth, are rounded at the upper edge, and the two sides approach, wedge-like, to form the lower edge, which is sharp and serrated, for attachment to the substance on which they may chance to be deposited. These eggs are attached by one end to the body of the cockroach; and when fully formed, they are placed upon any material which the wisdom of the mother deems fit food for the youthful inmates. This may be either a dress-coat, a cocked-hat, a cork, a biscuit, or a book, in fact, anything softer than stone; and the egg is no sooner laid, than it begins to sink through the substance below it, by an eating or dissolving process, which is probably due to the agency of some free acid; thus, sailors very often (I may say invariably) have their finest uniform coats and dress-pants ornamented by numerous little holes, better adapted for purposes of ventilation than embellishment. The interior of the egg is transversely divided into numerous cells, each containing the larvæ of I know not how many infant cockroaches. The egg gives birth in a few weeks to a whole brood of triangular little beetles, which gradually increase till they attain the size of huge oval beetles, striped transversely black and brown, but as yet minus wings. These are usually considered a different species, and called the beetle-cockroach; but having a suspicion of the truth, I one day imprisoned one of these in a crystal tumbler, and by and by had the satisfaction of seeing, first the beetle break his own back, and secondly, a large winged cockroach scramble, with a little difficulty, through the wound, looking rather out of breath from the exertion. On first escaping he was perfectly white, but in a few hours got photographed down to his own humble brown colour. So much for the appearance of these gentry: now for their character, which may easily be summed up: they are cunning as the fox; greedy as the glutton; impudent as sin; cruel, treacherous, cowardly scoundrels; addicted to drinking; arrant thieves; and not only eat each other, but even devour with avidity their own legs, when they undergo accidental amputation. They are very fond of eating the toe-nails; so fond, indeed, as to render the nail-scissors of no value, and they also profess a penchant for the epidermis—if I may be allowed a professional expression—of the feet and legs; not that they object to the skin of any other part of the body, by no means; they attack the legs merely on a principle of easy come-at-ability.

In no way is their cunning better exhibited than in the cautious and wary manner in which they conduct their attack upon a sleeper. We will suppose you have turned in to your swinging cot, tucked in your toes, and left one arm uncovered to guard your face. By and by, first a few spies creep slowly up the bulkhead, and have a look at you; if your eyes are open, they slowly retire, trying to look as much at their ease as possible; but if you look round, they run off with such ridiculous haste, and awkward length of steps, as to warrant the assurance that they were up to no good. Pretend, however, to close your eyes, and soon after, one bolder than the rest, walks down the pillow, and stations himself at yovr cheek, in an attitude of silent and listening meditation. Here he stands for a few seconds, then cautiously lowering one feeder, he tickles your face: if you remain quiescent, the experiment is soon repeated; if you are still quiet, then you are supposed to be asleep, and the work of the night begins. The spy walks off in great haste, and soon returns with the working party. The hair is now searched for drops of oil; the ear is examined for wax; in sound sleepers, even the mouth undergoes scrutiny; and every exposed part is put under the operation of gentle skinning. Now is the time to start up, and batter the bulkheads with your slipper; you are sure of half an hour's good sport; but what then; the noise made by the brutes running off brings out the rest; and before you are aware, every crevice or corner vomits forth its thousands, and the bulkheads all around are covered with racing, chasing, fighting, squabbling cockroaches. So numerous, indeed, they are at times, that it would be no exaggeration to say that every square foot contains its dozen. If you are wise, you will let them alone, and go quietly and philosophically to bed, for you may kill hundreds, and hundreds more will come to the funeral feast. So the sailors say: "Let them sweat," and sweat they do, and the least said about *that* the better. Cockroaches are cannibals, practically and by profession. This can be proved in many ways. They eat the dead bodies of their slain comrades; and if any one of them gets sick or wounded, his companions, with a kindness and consideration which cannot be too highly appreciated, speedily put him out of pain, and, by way of reward for their own trouble, devour him. They have a decided relish for port wine. Seeing a large cockroach one day standing on the top of a bottle of wine, part of which had been recently used, engaged in sipping what still adhered about the mouth, I pinned him to the cork by means of a fine needle. At first he spun madly round and round on his pivot, but very soon tiring of this exercise, and no doubt giving himself up for lost, he seemed to think he could not do better than drown his misery in the wine-cup, and in fact die drunk. Accordingly, he recommenced the imbibition of the vinous fluid, as cooly as though nothing had occurred to interrupt his enjoyment. I was just thinking of extracting the needle, when another cockroach, who had no doubt observed his helpless condition, and determined to profit by it, crawled up, and attacked him in the rear. The other wheeled about, and stood on the defensive, and a very interesting and exciting fight took place; the attacking party endeavouring to get up behind, and the attacked wheeling round on the needle, in order to keep his front to the foe, and dealing the assailant such powerful blows as to keep him for the time effectually at bay. Round and round the bottle's mouth whirled the couple, fighting with such determination and spirit, that there seemed little likelihood of the fight coming to a speedy termination; and there is no knowing how the battle *would* have been decided, had not other two brave and warlike 'roaches, scenting the battle from afar, suddenly appeared on the field, and taking part against the unhappy wine-bibber. He was now simultaneously attacked in front and rear, and very soon his struggles were over. His wings were rent in ribbons; then one leg, then another, was torn off; and he was in a fair way to be eaten alive, had I not at that instant placed the bottle gently in a basin of water, and pouring a tumbler of the same fluid on them, and drowned the whole three, and thus ended the unequal and unnatural contest.—*Chambers's Journal*, Dec. 22.

METEORITES.

STONY or metallic masses are projected from a large class of luminous meteors, to which the term meteorites—including aërolites, siderolites, and siderites—has been applied. Of such bodies, a catalogue, contained in a recent work by P. A. Kesselmeyer, on the "Origin of Meteorites," supplies the dates and places of fall of between six and seven hundred individuals. The pamphlet, although singular in its object in attempting to uphold a theory of the terrestrial origin of meteorites, is yet a very valuable essay on the subject of the geographical distribution of meteorites. From the maps of the continents, upon which the place of each fall, up to the year 1860, is faithfully laid down, it appears that 130 stone-falls of the list, since the beginning of the last century, belong to Europe alone; a rate of sixty a year, if extended uniformly over the whole surface of the globe. This computation of the number of meteorites fallen in with by the earth is certainly far below the mark. Von Schreibers reckons the number at 800; and other writers at even a higher figure. *One meteorite in a day* is, therefore, not an exaggerated estimate.

The height of the fireballs from which they fall, and their speed, greatly resembles that of the November meteors. A striking example of this was recently presented by the luminous meteor, which scattered a shower of stones, on the evening of the 14th May, 1864, in the neighbourhood of the town of Orgueil, in the South of France. The fireball shot from a height of between thirty and sixty miles above the earth, to a height of ten or twelve miles above Nohic, near Orgueil, where it disappeared, with a speed rated at twelve to thirteen miles in a second. Humboldt termed aërolites "pocket planets," partly on account of their distinct petrological character, and partly because the speed of their arrival from a foreign locality, makes known that, like the planets, they roam in wide and spacious orbits around the sun.

Aërolites are fragments, evidently of larger rocks; generally heavier than granite, sometimes compact, like marble, or trap, resembling in structure trachitic porphyry; at other times possessing a loosely coherent, almost earthy, texture, with considerable varieties of mineralogical composition. They consist of a flinty-grey cement, or a breccia-like volcanic tufa, in which is imbedded a multitude of fragments of broken crystals, spherules, metallic iron in grains, and here and there a small nest or spangles of yellow iron pyrites. The usual grains of metallic iron are sometimes wanting in the aërolites of Juvenas and Stannern, whilst in the siderolite of Hainholtz they exceed the stony part in bulk; and the mass of meteoric iron which fell at Agram, in Croatia, on the 26th of May, 1751, was capable of being forged into nails, so entirely free from earthy admixture is the iron of which the siderite is composed. Pure siderites, or masses of meteoric iron, have rarely been seen to fall, but specimens of native iron, occasionally met with upon the surface of the earth, are evidently of meteoric origin, deposited there by meteors, the antiquity of whose fall is unknown. The metals nickel, chromium, cobalt, tin, copper, and lead, and others, have successively been discovered in meteoric masses. Carbon occurs in the form of graphite; and phosphorus and sulphur in combination with iron. Alkaline and the other earths, especially magnesia, form, with silica and iron, the flinty part of the structure, almost identical with certain volcanic lavas, but strikingly distinguished from all terrestrial scoriæ by the occurrence of iron, in meteorites, in the metallic state. So great is the heat to which their exterior surface is exposed, in the fireball that attends their passage through the air, that a thin black crust, or molten substance of the mineral, envelopes them completely; and they not unfrequently reach the ground so hot, that one which fell at Eichstadt, in Bavaria, on the 19th of February, 1785, was first cooled in snow before it could be handled.

The first chemical analyses of meteorites, by Edward Howard and the foreign chemists already named, at the beginning of the present century, which made known the existence of the metal nickel as a characteristic ingredient of meteoric iron and stones, and those of Berzelius, Wohler, and others, in later times, succeeding in establishing the fact that no elementary substances have hitherto been found in meteorites which are not already known to exist upon the earth. Whether this is true regarding the mode of their chemical combinations, is a matter not yet sufficiently ascertained. The meteorites of Orgueil, besides the usual inorganic constituents, contains six per cent. of a black amorphous organic substance, composed of the organic elements, carbon, hydrogen, and oxygen, in proportions quite similar to those in which they occur in lignite and peat; in other words, a veritable *humus*. M. Wohler infers from all the facts, that wherever meteorites originate, organic matter—and hence probably, also, organised matter—*organism* in fact—must have an existence. The various annals of science, and the journals and proceedings of philosophical societies, contain many such researches. Indeed, the literature respecting meteorites, constitutes already a branch of study by itself, which, under the name of "Aërolitics," has for its theme the splendid collections of meteorites at present to be found in the galleries of most of the great mineralogical museums. A work, entitled "An Index to Aërolitic Literature," has lately been published by Dr. Otto Buchner, by means of which the original accounts of meteorites may be consulted, and the facts are collected.—*Edinburgh Review, January*, 1867.

COLOURED RAIN.

THE first illustration which we shall quote is that memorable example of red rain known to have fallen at the Hague in the year 1670. It has been related by Swammerdam, that, early one morning in that year, the whole population was in an uproar. It was soon discovered that the commotion arose from a mysterious rain of blood, as it was considered by all. This rain must have fallen during the night hours, for the lakes and ditches were known to have been full of water on the preceding evening. People of all classes, high and low, were affected by this apparent miraculous act of Providence, foretelling scenes of approaching war and bloodshed. There happened, however, to be a certain physician in the town, whose scientific curiosity urged him to inquire into the cause of this wonderful phenomenon. He obtained some of the water from one of the canals, analysed it with a microscope, and found that it had not really changed colour, but that the blood-like red was produced by swarms of small red animals or insects, of perfect organization, and in full activity. This scientific physician immediately announced the result of his examination of the water; but though the Hollanders were convinced of the accuracy of his discovery, they did not appear to be anxious to divest the occurrence of its prophetic character. On the contrary, they concluded that the sudden appearance of such an innumerable host of red insects was as great a miracle as the raining of actual blood would have been; and, in after years, there were many who believed this phenomenon to have been a prediction of the war and desolation which Louis XIV. afterwards brought into that country.

It has been supposed that the insects alluded to above, and the cause of such a universal panic, were a kind of water-flea, with branched horns, called by Swammerdam *Pulices arborescentes*. How they became so suddenly multiplied has never been explained, except by the rational supposition that they were brought from a distance by the wind, and then deposited with the rain.

Something analogous to this came under the eye of the writer a few years ago. During a very gloomy rain which fell at Greenwich, a universal deposit of small black flies was found to have taken place. The plants and shrubs in the writer's garden were covered by hundreds of thousands of these insects, in some instances completely hiding the plant from view. Before the rain began not one was noticed. We have been lately informed that a similar deposit occurred at Cambridge about eleven years ago.

On the 14th March 1813, the inhabitants of Gerace, Calabria, perceived a terrific cloud advancing from the sea, the wind having blown from that direction during the two preceding days. At two o'clock in the afternoon this dense cloud, which gradually changed from a pale to a fiery red, totally intercepted the light of the sun.

Shortly after, the town was enveloped in a darkness sufficiently great to excite timid people, who rushed to the cathedral, thinking that the end of the world was approaching. The appearance of the heavens at this moment was unspeakably grand, the fiery red cloud increasing in intensity. Then, amid terrific peals of thunder, accompanied by vivid flashes of forked lightning, large drops of red rain fell, which were hastily assumed by the excited populace to be either drops of blood or fire. The rain more or less coloured, continued to fall until the evening, when the clouds dispersed, and the people were again restored to their ordinary tranquillity.

Some coloured rain, which fell under similar circumstances to the above, in another part of Italy, was subsequently analysed by M. Sementini, who found that the colouring matter consisted of light dust of a marked earthy taste. By the action of heat he discovered that this earthy deposit became brown, then black, and finally red. After being thus calcined, numerous small brilliant particles of yellow mica could be perceived by the naked eye. M. Sementini concluded from his analysis that the deposit was compounded principally of silica, alumina, lime, carbonic acid, and oxide of iron. A yellow resinous substance was also found to be a part of its composition. It is very probable that these, and similar specimens of coloured dust, were first emitted from an active volcano, and afterwards carried a considerable distance through the upper regions of the atmosphere, finally descending in the form of rain.

A coloured deposit, resembling brick-powder, took place in the valley of Oneglia, Piedmont, during the night of the 27th October, 1814. This powder covered the leaves of the trees, grass, etc. On the following day a very fine rain fell, which, on being evaporated, carried away the more soluble and less coloured particles. The remainder, accumulating in the cavities of the leaves, produced the startling appearance of blood-spots, and created the utmost consternation amongst the peasantry. The deposit was of a decided earthy flavour, and was supposed by M. Lavagna, a resident physician, to have been of volcanic origin, brought from the south by a high wind which had blown from the quarter during the night. The celebrated French philosopher M. Arago, referring to this phenomenon, has remarked, "Is not this an example of those pretended rains of blood which were always considered by the ancients to be such fatal omens?"

In an analysis of some coloured rain of this description, which fell in the Netherlands in 1819, it was discovered by MM. Meyer and Stoop, chemists of Bruges, that the colouring matter was principally chloride of cobalt. On another occasion, in Tuscany, a quantity of the coloured matter deposited on the leaves of plants was collected in the Botanical Garden at Siena, and subjected to analysis by Professor Giuli. It was found to be composed of some vegetable organism, in addition to carbonite of iron, manganese, carbonate, of lime, alumina, and silica. In a remarkable fall which occurred on the 19th February, 1841, in the district between Genoa and the Lago Maggiore, the earthy deposit consisted of talc, quartz, carbonate of lime, bituminous matter, and also some remains of the seeds of different plants.—*Edwin Dunkin, in Leisure Hour*, Jan. 5.

MEN, ANIMALS, AND PLANTS.

Aristotle was one of the first to notice the resemblance between man and animals, but his remarks on this subject are of various value, but he wisely recognises the great importance of physiognomical observations. Some of his statements are most true, and all are interesting, as occurring to one who lived so long ago. He said that no man was entirely like a beast, although some of his features indicated occasionally a brutal character. He remarked that weak hair had cowardice, and strong hair courage. Thus the deer, the hare, and the sheep, which have soft hair, are less courageous than the ox, the boar, or the lion, which have coarse hair. Also, that birds having firm and rough feathers were in general more courageous than those with soft feathers. He applied the same principle to man. Thus, those men who have strong hair were courageous, and those who have weak hair were relatively wanting in courage. Animals distinguished for courage or nobleness have clear and sonorous voices, which they vent in a distinct, slow, and measured manner, while those with prattling voices are weak and mean-spirited. Aristotle's remarks on the character of the men who resemble animals are of less value. Porta, Haller, Versalius, Camper, Buffon, and Lavater—all have written on the resemblance between man and animals; but the remarks of some of these writers are very fanciful, and contain amongst the few embers of truth much that is best consumed. What Camper, Haller, and Lavater state from their own observation is, however, of great value. After having studied these subjects for some years, I was made acquainted with the researches of these great writers, and was much pleased to find that in many cases my observations were confirmed, which is doubly valuable as the confirmation of impartial authorities.

The resemblance and difference between man and animals has always appeared to me to be a subject of vast importance, for by its just appreciation the position of man in the scale of being is defined. Extended researches into every branch of science have convinced me that man is the "Microcosm," the epitome of creation. The axis of creation turns on man ; for nature in her lowest, as in her highest forms, affords illustrations of man, both as a being and as an individual. He who understands this but interprets the universal language of nature. But there are various ways in which man illustrates lower forms of life. The first, and most extensive, is by analogy ; the second, or more confined, is by the actual resemblance which creatures bear to the head of the animal creation.

"Like master like man" is an old proverb, this should be like master like dog, horse, or pig, for animals through the influence of sympathy—true "animal magnetism," acquire the qualities to a certain limited extent—of the men they are with ; but I shall in this paper confine myself principally to the actual resemblance that some animals bear to man. Had I space, it would be easy to point to the marvellous way in which animals and plants by analogy illustrate man ; and how, even the inorganic world in its varied elementary system, points to the qualities of his mind, and how the races of man by their geographical distribution harmonise with the qualities and peculiarities of their various habitats, and how the history of man is typified in that of the earth with its rocks and fossils, which are but the antitypes of great deeds, and of their producers—heroes.

In plants, the lower division of organisms, we see many types of man—I could name hundreds, but shall at present only mention a few, whose appearance and qualities remind us of his. Red apples have mostly a sharp flavour, as have red currants, berberries, and many other red fruits. Black fruits have an intensely strong flavour, as black currants, black grapes, and black elderberries. Very light coloured fruits, as white-heart cherries, white currants, and light coloured plums, have a more delicate flavour than the red or black of the same family. White strawberries have much less taste than the red, as have light coloured gooseberries. Yellow fruits are commonly sweet and luscious, with less flavour than red or black ; as for instance yellow gooseberries, yellow plums, and yellow apricots—for the best flavoured apricots are streaked with carmine. The sweet, rich, and sustaining grain is golden, as is the basis of our nation's credit. These various colours point to the various qualities of the fruits of the earth ; they are not less significant of those of the sons of Adam. Red haired races are fiery, impetuous, and have strongly marked qualities, as in red skinned peoples. The black-haired have even a greater extreme of qualities, but are less susceptible of improvement than the yellow and lighter brown. Black skinned races likewise have intense peculiarities, and their types are usually extremely permanent ; how difficult it is for instance, to eradicate the traces of negro blood ; one drop of ink will discolour a glass of clear water.

The Scandinavian, the most precious race on earth, has often golden hair ; sweetness and equanimity of temper is more commonly found amongst them than in other divisions of mankind. The different combinations of colour in fruits point not merely to a union of various qualities, but typify similar combinations in men. Thus the yellow and red apples, mangoes, tomatoes, and the woody nightshade, are both sweet and sour, or have other divers qualities. Similar remarks may be made with regard to streaked gooseberries, variegated strawberries, melons, and a vast variety of other fruits, which have their prototypes amongst men with yellow hair and dark skins, black hair and fair skins, or dark hair with bright complexions. Fruits which longest retain their good qualities are seldom black or red ; and dark and red-haired races have generally less evenly-balanced frames, and consequently do not live so long as those of more mixed colours.

Lastly, those fruits which show great paleness of colour and a want of flavour have analogy with albinos, or those who, from extreme fairness, have a bleached appearance. Such are generally characterized by a want of vigour.—*Land and Water*, Dec. 22.

LIGHTNING FIGURES.

It is related that Benjamin Franklin was often heard to speak of a man who was standing near a tree when it was struck by lightning, and that an exact representation of the tree was afterwards found on the man's breast. We have not been able to find this statement in any of Franklin's printed works, but similar statements are made in the newspapers every year. Thus we read that in August, 1853, a little girl was standing at a window before which was a young maple tree, and a complete image of the tree was found impressed on her body after a flash of lightning. Again—a boy climbed a tree to steal a bird's nest ; the tree was struck by lightning, and the boy thrown to the ground. "On his breast the image of the tree, with the bird and nest on one of its branches, appeared very plainly." An Italian lady of Lugano was sitting near a window during a thunderstorm, and had the portrait of a flower permanently impressed upon her leg. A case is recorded in which some sheep were killed by lightning. The animals were skinned, and the fellmonger found "a very accurate representation of the tree and a portion of the surrounding scenery on the inner surface of each skin." During the year 1866, two such cases have been reported.

A few years ago a scientific man, M. Poey, attempted to prove that these curious figures were really photographed by the lightning; that the surface of the human body might, in fact, be so sensitive to the intense light of the discharge, that a picture of a tree might be impressed on the body of a person standing near it. M. Poey forgot to explain how a reduced image of the tree is formed, or what performed the office of the lens which in photography converges the rays of light which proceed from the object, so as to formed a small optical image on the sensitive plate. As long back as 1786 a report was made to the Academy of Sciences of Paris, on some tree-like figures found on the body of a man who had been killed by lightning. These marks were accounted for on the supposition, that the lightning, in passing through the body, had forced the blood into the vessels of the skin, so as to make all their minute ramifications visible on the surface. We read in the *Lancet*, July 30th, 1864, that some boys had been struck by lightning, and the medical man who reports the case says of one of them, "The figures on either hip were so exceedingly alike, and so striking, that an observer could not but be impressed with the idea that they were formed in obedience to some prevailing law."

Our knowledge of these occurrences is chiefly derived from the remarks, not of trained observers but of ordinary bystanders, who, seeing a tree-like figure on the body of the person struck by lightning, naturally associate it with the tree. To make their narration more surprising, they call the image "a true picture," or "an exact representation of the tree." A blur in the image will pass for the bird's nest; another blur for the bird, and so on. Nothing is more difficult than to observe and report a fact correctly, especially when the theory which apparently explains the fact is already in circulation. It is popularly admitted that lightning has this wonderful property of imprinting a copy of a tree on the body; and when a ramified figure is seen on the skin, an unskilled observer concludes that it is a copy of the tree; and if the figure have a number of small branches, he will declare the copy to have all the minute details of a photograph, as indeed was said in a case reported in the *Times* of the 8th of September, 1866. The true explanation was given in a paper read by Mr. Tomlinson before the British Association, in 1861, by whom it was shown that common electricity, in passing between two conducting surfaces, actually forms a tree-like figure, which can be made visible.

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In imitating these effects with electrical apparatus, a Leyden jar may be conveniently used, in which electricity has been accumulated by the usual process. If the jar be discharged by means of a bent wire, with a knob at each end and a glass handle in the middle (called a discharging rod), the two electricities will rush together without passing through the body of the operator, and there will be a dazzling spark of light, and a loud crackling noise—the one representing the lightning, the other the thunder. If we hold, between the upper knob of the discharging rod and the knob of the Leyden jar, a piece of window glass about four inches square, the discharge will pass over the glass, turn round the edge, and so get to the conducting knob of the discharging rod. On holding the pane of glass up to the light nothing is seen, but on breathing on the glass a remarkable tree-like figure becomes developed. consisting of a trunk, and a number of branches and twigs, the manner of producing which may be thus explained. All objects exposed to the air become covered with an invisible organic film, which no dusting or ordinary cleaning will remove. Wherever this electricity touches this film it burns it away, and leaves the glass chemically clean; so that, on breathing on the surface, the breath condenses in continuous streams wherever the electricity has been; while in other parts of the plate, where the film still remains, the moisture condenses in minute globules or dew.

The electric figures consist of a main trunk of a somewhat rippled character, representing the line of least resistance along which the principal discharge travels. This trunk is evidently hollow, and reminds one of those lightning-tubes sometimes found in sandy districts, formed by the lightning striking the ground, penetrating it, and fusing the sand into a tube, twenty, thirty, or forty feet long. These tubes are called fulgurites, and specimens may be seen in the British Museum. They are often branched, showing that the lightning divided, or *bi-furcated*, as it is called, and when there are three branches, *tri-furcated*. This is exactly what sometimes takes place when a building is struck. The discharge may fall at the same moment on two or even three parts of the building, or it may strike the building and then divide into two or three branches. In like manner the figures on our glass plates sometimes give admirable examples of bifurcation and trifurcation. But whether each trunk be single or divided, it is accompanied by a number of smaller branches.

It is a remarkable circumstance, that in the formation of this tree-like figure, the trunk is not the first to be produced. The electricity sends out feelers, which find out, as it were, and prepare the line of least resistance, along which the principal discharge can most readily take its way. It is a common observation among sailors, that before a ship is struck they experience a tickling sensation, as if spiders' webs were being drawn over the face. This is exactly what takes place if a glass tube be rubbed with a dry silk handkerchief, and moved up and down before the face. A similar sensation is felt by some persons if an electrical machine be worked in the room where they are sitting. We have proof in our glass plates that the branches and spray precede the main discharge; for if the glass be so thick as to oppose too much resistance, the jar is not discharged; but upon breathing upon the glass plate we get the spray, and some of the smaller branches of the figure, but not the trunk.

A singular confirmation of Mr. Tomlinson's theory may be found in the fact that when a tree is struck by lightning, and portions of the bark are torn off, the passage of the discharge may be sometimes traced by ramified lightning figures impressed on the inner surface of the bark. Dr. Pooley has communicated to the writer such a case, which occurred in 1857, at Oakley Park, near Cirencester. The lightning first fell on a branch north-west of the tree, which it barked, and shivered to pieces; it also passed through the fork of the tree, and descending the south-west side, cut a clear line, about one inch and a half in width, out of the bark, and loosened other portions of the bark to the extent of one foot and a half on each side. The seam gradually widened as it reached the knotty roots. The chief lines of the figure were goughed out, roughened, and slightly charred at the edges; but such figures whether on the bodies of men or on the bark of trees, are not very permanent. They fade in a few days, or even hours.—*People's Magazine*, *Jan.* 19*th.*

WEATHER SIGNS.

CHANGES of weather may be foreseen, often by long intervals, by other aids far more efficacious than those of the moon, or of weather cycles; a moon's changes' rivalry even may be established with the meteorologists of Whitehall. The apparatus required may, with the exception of a barometer and the clouds, be all found in the animal kingdom, a careful observation of the habits of some of the denizens of which is the sure road to successful weather wisdom. There seems to be a sensibility to atmospheric change in the lower orders of creation which answers them as instincts, and directly gives them information which man only arrives at by the longer road of reason. The scent of the hound is an instance of a delicate sense, which we cannot form an idea of, though it may help us to conceive the possibility of "pigs seeing the wind," or of horses and cattle "sniffing a distant storm." A sow carrying straw in her mouth to make her bed is as sure an indication of coming foul weather as any the barometer can give; and when puss turns her tail to the fire, and in that position commences to wash her face, it is said the same event is predicted. It is as true of the skies as of domestic affairs, that when the hen crows a change for the worse is at hand; and, as to the lord of the poultry yard, we have the old saying, that—

> "If the cock crows going to bed,
> He'll surely rise with a watery head."

Robin Redbreast singing in the midst of rain on the top twig of a tree is an infallible index of a beneficial change to fair for a few days at least; and the screech of the owl under similar circumstances is said to have the same meaning, though the peacock's screech at all times denotes ungenial weather. Frogs also furnish their signs, becoming brown on the approach of rain, but remaining yellow so long as it is absent. There is a curious weather-glass made in Germany, the materials entering into the composition of which are two frogs, two small ladders, and a cylindrical vessel of water. Frogs and ladders being duly put into the water, if the froggies climb their ladders and look over the vessel's side, foul days are at hand; if they remain below, the sky will continue fine. Leeches in water furnish similar indications; but spiders and snails are the most remarkable of all the weather prophets. When the former make their webs at night, the morning is sure to be fine; if they make them in the morning, the coming day may be relied on for a drive or walk. Hence the saying:—

> "When you see the gossamer flying,
> Be you sure the air is drying."

An instance is on record of a French officer, confined in a prison in Utrecht during the wars of the French revolution, having so closely and accurately observed the habits of some spiders that were his sole companions, that he was able by their movements, to foretell a frost fourteen days before it came, and thereby turn the certain defeat of the French army into a glorious victory. But snails are remarkable weather indicators. Like frogs, their colours change on the approach of rain, and some species indicate rain so much as ten days before by tubercles, which appear on their bodies, and seem intended for the purpose of imbibing the approaching moisture. As a general rule these creatures, according to their habits, two or three days before rain, may be seen climbing the trunks of trees, or seeking shelter under leaves, or making their way to open places. We thus see that by a careful assortment of spiders, snails, frogs, and leeches, and a few domestic animals, combined with a good barometer, and accurate observation of the language of the clouds, and the song and cries of birds, any person may easily become a weather prophet of no mean practical wisdom.—*London Review*, Dec.

THE ARTESIAN WELL OF GRENELLE AT PARIS.

THESE wells were first known in Europe in the province of Artois, in France, from whence they take their name. Centuries before they were prevalent among what is called civilized nations, the " barbarian " Chinese knew their value, and they have been in use in China from a date beyond record. It is said that ten thousand of them may be found in one Chinese province ; this is probably an exaggeration.

The principle of these artesian wells is the same as that of a fountain. *Everywhere water finds its own level.* Supposing the spring takes its rise in a mountain, it penetrates through sand or porous earth to a great depth into the valley below, and which is situate, perhaps, miles from the source of the spring. By boring into the valley to the depth of the water, the latter rises of its own impetus to as high as the mountain stream from whence it sprung. Below this sand and porous earth there is sometimes a bed of clay to be perforated to the underlying chalk. This was the case with the Artesian well at Grenelle. Upwards of 194 feet had to be bored below the spot where it was said water would be found.

The statistics given of this well are very interesting. It was commenced in 1833, and completed in 1841. The borer weighed 20,000lbs., and was three times the length of the height of the Hôpital des Invalides in Paris. When the boring had been successfully performed to within 548 feet of its completion, the great chisel attached to the borer fell, with 262 feet of rods, to the bottom, the whole of this fallen mass weighed five tons. The engineer, M. Mulot, nothing daunted, put a screw on the end of the fallen rods ; attached others of sufficient length to them, and, after fifteen months of labour, drew up the chisel. At another time, to give impetus, the chisel was raised with great force, and sunk at one stroke, into eighty-five feet of chalk. The depth of the Grenelle well is four-and-a-half times the height of St. Paul's, and nine times that of the monument in London. If Strasburg Cathedral, the Hôpital des Invalides in Paris, St. Peter's at Rome, St. Paul's and the Monument in London, were piled one upon the other, they would not be so high as the well of Grenelle is deep by more than eleven feet. Astoundingly deep as this is, there is an Artesian well in the Duchy of Luxembourg which is upwards of 1,000 feet deeper than that of Grenelle.

The water of the Grenelle has its source in a stratum of sand, which lies considerably higher than the level of Paris, but it had to be bored for, first beneath the clay, and into the chalk which forms the subsoil on which Paris stands. The peculiarity of this water is that it is not *aërated*, and being consequently unfit for drinking, a tower had to be constructed, in the centre pipe of which the water is forced up, and descends on the outside in innumerable threads, so as to expose as much of its surface as possible to the air.—*Ladies Treasury*, January.

LEAVES AND BARK.

LEAVES.—When the leaves have accomplished their physiological functions, they fall, even in the year which witnessed their birth. But there are some which are not detached till the following year, while others remain for many years attached to the stem. The leaves of most of the conifers, those of the box (*Buxus*), the holly (*Ilex*), of the orange-trees (*Citrus*), do not shed them in the year in which they are developed, but are met by a continual growth of new leaves. These plants are never seen naked ; they constitute the plants commonly known as evergreens. In the first of these states the plant is said to be deciduous, from *de*, down, and *cado*, I fall, when the leaves fall before the next spring. They are marcescent from *marcesco*, withering, when they wither before falling, as in the oak and beech. They are persistent, from *persistens*, remaining, standing, when they remain longer than a year.

In some plants, as the cactus, the leaves are shed almost as soon as they appear. These are said to be *caduccans*, from *Cado*, I fall. The leaf thus dies, like all created beings, when the purpose for which it was created is accomplished. The immediate cause of death seems to be this : the cells of which it is composed have become encrusted with foreign matter, deposited during the processes of digestion and evaporation carried on by the organ, which then becomes incapable of further action.

On the subject of the distribution of evergreen trees, August de St. Hilaire makes the following remarks :—" As we retire from the tropics, the number of evergreen trees goes on diminishing in rapid succession. At Porto Allegra, near latitude 30 deg. south, I found in the coldest season that the trees nearly all changed their leaves. At San Francisco de Paula, near the Rio Grande, in 34 deg., nearly one-third of the ligneous vegetation had lost their leaves; and finally, at two degrees further south, a tenth of the trees only preserved their foliage. At Montpellier, the fields in winter are not yet deprived of verdure; and Lisbon, Madeira, and Teneriffe present a still more considerable number of trees always green. It must not be supposed, however, that in the tropics all the trees are evergreens. Even in the vast forests which occupy the Brazilian coast, and where vegetation is maintained in continual activity by its two principal agents, heat and moisture, there exist trees, such as some of the Bignoniaceæ, which lose every year, like European trees, all their leaves at once, but immediately after, they are covered with flowers, and in a very short time these are succeeded by new foliage. I speak here of woods growing in equinoctial regions, where, as with us, rain and drought have no determinate period. In countries, on the other hand, where six months' continual rain is succeeded by uninterrupted dry weather, there are woods which every year remain for a considerable time destitute of verdure, and the traveller who traverses them is scorched by the ardent blaze of the equinoctial zone, while he has before his eyes the leafless image of European forests during winter. We have even seen this excessive drought continue during two years, and the trees remain for two years without their foliage."

BARK.—The *bark* of trees is essentially composed of fibrous and cellular tissue; but it is easy to understand how varied are the forms, disposition, and structure of these substances, when we consider the extraordinary variety in the appearance of the bark of trees, and the diversity of their products. To explain everything which relates to the structure of the bark, would lead us into details which our space does not admit. We must therefore limit our remarks, and content ourselves with pointing out the principal characteristics of bark. Briefly, the young stem is invariably covered with a thin cuticle, the *epidermis*. As the stem increases, new bundles of woody fibres are deposited in regular annular layers one in each year, the new layers being deposited outside those already formed. The new layers of bark and wood are thus formed almost in contact. The epidermis covers the bark, as it does every other part of the vegetable, but its existence is altogether ephemeral. It is destroyed at an early stage as much by the growth of the vegetable as by the action of external agents. It is otherwise with the *suber*, which forms the next layer, the cells of which are of a cubical form, and are closely united to each other with thin walls or partitions, without colour at first, but afterwards they acquire a brownish hue.

In many trees the *suber* is very slightly developed. But this is not the case with the Cork-oak (*Quercus suber*). In this beautiful tree, which furnishes man with one of his most useful commercial products, the *suberous layer* acquires an extraordinary thickness; it is, in short, the substance known as cork, in Latan *suber*, whence the specific name of the tree. When about five years old the *suber*, which constitutes the greater part of the bark in the cork-tree, begins to make a remarkably quick growth; then all the energy of its vegetation seems to concentrate itself on this part of the tree. New cells appear on the internal face of the primitive zone, pressing upon the exterior cells which preceded them. Independently of these cells, the successive accumulation of which constitute the mass of cork, others are formed which are shorter, darker in colour, of a flat or plate-like form, which divide the mass of cork into successive zones of growth. This mass attains by degrees to a considerable thickness. If left to itself, it would crack so deeply as to become unfit for the uses to which cork is applied. It is necessary, therefore, to strip it off before it acquires this hard and fissured appearance.—*Louis Figuier's Vegetable World.*

ELEPHANTS.

Having related the modes of capturing elephants practised in India in the present day, perhaps my readers may not be unwilling to compare them with the ancient methods of taking these huge animals; and the following account, taken from Arian's book on India, will doubtless prove interesting. Arian was a Greek writer, and lived in the second century of our era. He derived his information chiefly from memoirs left by Alexander's generals, and from other Greeks who visited India about the period of its invasion by this great monarch. "The Indians hunt other wild animals, just as the Greeks do; but their mode of taking the elephant is quite peculiar, as indeed, the animal itself resembles no other. Having picked out a level piece of ground open to the sun, they enclose by a ditch a circular space large enough for the encampment of a considerable army. The width of the ditch is about thirty feet, and the depth about twenty-four. The earth that is dug out is heaped up on each margin of the ditch, and serves as a wall. In the exterior wall thus formed, they make excavations which serve as hiding-places, from which, through certain holes that are left for supplying light, they watch the elephants as they approach and enter the enclosure. Then, having placed three or four very tame female elephants within the enclosure, they leave one entrance, which is made by bridging over a part of the ditch; and, that the elephants may not have any suspicions, they throw a quantity of earth and grass on the bridge, to prevent the animals from seeing what it really is. Having done this, the hunters hide themselves in their holes. Now the wild elephants never come near inhabited spots in the daytime, but when it is night they ramble about in all directions, and feed in herds, following as a leader the largest and boldest of their company, just as cows follow the bulls. When the elephants have come near the enclosure, they discover the females, both by their noise and smell, and, hastening towards the spot, they run round the ditch till they find the bridge, over which they all try to push into the enclosure. The huntsmen, on seeing the elephants within the ditch, quickly take the bridge down, while others of the party run to the neighbouring villages to let the people know that the elephants are caught. A large party now mount all their strongest tame elephants, and ride straight to the enclosure, where they wait till the wild elephants are much weakened from want of food and water. When the hunters think the elephants are thus sufficiently subdued, they set up the bridge again, and the tame elephants, entering the place, commence a fierce contest with the wild ones, which naturally terminates in favour of the tame animals, as their opponents are quite exhausted by what they have suffered. The riders now, getting down from their elephants, tie the feet of the wild ones while they are in this helpless state, and then urge the tame animals to beat them till they fall down. The next process is to put ropes round their necks and mount them as they lie on the ground. To prevent the elephants, however, from throwing off their riders, or doing any other mischief, they make an incision with a sharp knife in the skin of the neck all round, and fit the rope into it, that the pain from the sore may make the animals keep their heads steady. The elephants being thus compelled to remain quite, and feeling that they are subdued, are led by a rope, which is attached to the tame ones.—*Land and Water, Dec.* 22.

Granite.

I have been much struck by the numerous instances, in the Highlands of Scotland, in which pieces of hornblende, having the shape of water-worn pebbles, are found in granite. Autumn tourists will find a flattened specimen in the first pier of the wall of Lord Seaforth's park-wall, on the road from Grantown, and a triangular one, rounded at the angles, on the bevelling of the left-hand pier of the park gate. I have also several specimens in my possession. In shape, they resemble the specimens of granite found in the lower series of the Old Red Sandstone. Rolled pieces of the same kind also occur in red granite. There is nothing inconsistent with what is now going on in Nature in supposing these to have been first water-worn and then inclosed in their granitic bed on the solidification of the latter in an age when silica and alumina appear to have been very abundant,—as much so as lime at a later period—for the deposition of siliceous matter is now going on in New Zealand. "Grand and beautiful geysers, ejecting water two degrees above the boiling-point of pure water, and holding various silicates in solution, are found around the lakes of Rotomahana and Rotorna. This water on cooling incrusts every substance it comes in contact with, and birds thrown into it are brought out like pieces of flint. On looking down through the clear, smooth water of the Te Tarata geyser on Lake Rotomahana, the siliceous matter is observed deposited at the bottom, like the hills on the eastern side of Lake Taupo—a formation which, when seen from a canoe on the lake, 'suggests to the eye waves of lava suddenly cooled." (Thomson's "New Zealand," vol. i., p. 12). Silicates thus deposited would, on crystallizing, discharge any superfluous matters. The particles of hornblende, &c., thus ejected, unable to escape from the overwhelming mass of siliceous matter have arranged themselves so as to give granite its spotted appearance, and, under some circumstances, have given rise to the stratified appearances so prominently seen in gneiss. The former would occur when the crystallization took place in masses, or when the liquid was in a state of agitation,—the latter when the siliceous matter was deposited in layers.—JOHN JOS. LAKE.—*Athenæum*, Jan. 12.

The Mulberry Tree.

The following information on the cultivation of the mulberry tree in the kingdom of Siam will not be without interest. It is chiefly in Laos, or the kingdom of Lieng-Mai, a tributary to Siam, that the rearing of silkworms is carried on on some scale. The greater part of the silk produce is employed on the spot by native industry, so that very little of it comes to the Bangkok market. The annual export of this product does not exceed 50,000 kilogrammes (50 tons). Of late years several lots of it have been shipped for Europe. The Laos silk is of an excellent quality, but the means used for spinning are very imperfect, so that this product is placed amongst the inferior qualities. The Anamese, who are established in the neighhourhood of Bangkok, rear silkworms, but in small quantities. They understand the method of their treatment better than the inhabitants of Laos and Cambodia, and their products are better able to compete with the good qualities of China and Japan; but the whole of the silk produced by them is used for domestic purposes, and none is found in commerce. The mulberry is the object of special care in Laos and Cambodia; but it equally succeeds in all the Siamese provinces, and the rearing of silkworms might be successfully carried on there, as proved by the attempts at Bangkok, which is less advantageously situated. It appears up to the present time that no epidemic disease has made its appearance either in Laos or in Cambodia. The Anamese employed in the rearing of the silkworms from eggs from Laos have observed that after that they have been reproduced three or four times a fresh stock should be obtained; this, however, seems to indicate a germ of disease. Should the worms a few days after hatching seem ill and not likely to succeed, the air is changed by taking them somewhere else; this often produces the desired result. If some crops are lost it is not due to the epidemic. The eggs are transformed into cocoons at the end of a month. Three or four crops of silk are usually produced yearly, during the months of May, June, July, and August. They can be reared during other months of the year, but with less success.—*Journal Soc. of Arts.*

Alligators.

Most of the streams of tropical Africa abound with alligators. They are apparently of the same species as those of the Nile, and, so far as I can see, very similar to those of the Victoria and other rivers of North Australia. But it is singular that, while the rivers of Natal on the east or coast side of the Drakensberg contain great numbers of these reptiles, not one is to be found in the tributaries of the Vaal or Orange rivers; or in any of those streams of the elevated plateau of the interior, on the west, which lie nearly in the same latitude (from 27° to 30° south), while the Limpopo, which rises but a short distance further north, or in about 26° south, is expressly called Krokodil River by the Dutch colonists of the Transvaal country.

On the shoals of the Zambesi, from the sea to Tette and Kabrabasi, in fact, all the way to the Victoria Falls, and in the Bo-tlét-le River and Lake Ngami, they may be seen basking on the sands or rocks, or floating like shapeless logs in the quiet reaches.

In the dry ravines that carry off the occasional torrents of Namaqua land, no one would expect to find them; and, though I certainly must confess to having dreamed of alligators there, it was during the delirium of fever, and I still had sense enough to picture them all dead of thirst, lying for many days' journey along the borders of the waterless gully. Here, again, only a few degrees to the north, the Okovango River, discovered by C. Andersson in 17° 30′ S., is full of them; but in this case the permanence of the deep and slowly flowing stream is sufficient reason for it. I can only surmise that perhaps the difference of temperature, caused by the elevation, may prevent them inhabiting the rivers of the plateau, and invite them to those of the lower regions on the coast from Delagoa to Natal.

To fire at them is in general of little use; for, though they lie sufficiently exposed, their position is invariably such that, if life enough is left to make but one convulsive motion, that motion launches them from rock, or shoal, or sloping mud-bank toward the water, in the depths of which they lie till either they regain strength enough to escape, or the generation of gas causes the dead bodies again to float upon the surface. Sometimes, indeed, they are torn to fragments in the interim by their fellows, who will even drag down the carcass from the shore, as they did with one killed high and dry by Mr. Baldwin, near Natal, a few years ago.—S. BARNES, F.R.G.S., *in Leisure Hour*, Jan. 26.

THE OCEAN CURRENTS.

Professor Grimes, of Philadelphia, made the following remarks upon the subject of the Ocean Currents, at a recent meeting of the American Institute—Polytechnic Branch, the president, Professor Tillman, being in the chair;—Columbus, during his first voyage, discovered in the midst of the ocean an immense stream moving with great velocity and superior in its proportions to the largest continental river known. Since the announcement of the existence of this, the Gulf Stream, similar currents have been traced, both in the Pacific and Indian Oceans, and now physicists recognised five, one each in the North and South Atlantic and Pacific, the remaining one in the Indian Ocean. The six continents of the world are arranged in pairs, as a glance at any map will show. Hence, from this and many other points of similarity, it is evident that whatever force caused the one repeated itself in forming the others. The hypothesis advanced by Professor Grimes refers the question back to the age when the entire earth was covered with water, at which time six elliptical currents were formed. Five now remain; the sixth one was formed in the North Indian, an ocean which, owing to the elevation of land, no longer exists, but the Caspian and Aral seas, and the large lakes of Asia furnish proof of its former reality. By a simple mechanical problem we can demonstrate why these ellipses were formed. If near the edge of a disc revolving rapidly on its centre a ball is placed, and caused by any means to pass alternately back and forth on the radius, its motion will not be in a straight line, but it will invariably traverse an ellipse. To make an application: when the waters in the Gulf of Mexico have become heated by the sun, the tendency will be to pass north until cooled, then to return to the equator, and such would be the only motion were the earth at rest; but the revolution of the earth is a constant force acting upon the current of water and gradually overcoming this northernly motion, and turning it to the east, by the coast of Ireland. Becoming cool, it seeks the warmer regions, and the easting is transferred into a general southernly direction, but as it nears the coast of Africa, its velocity is lost, and as the earth moves more rapidly than the current, the latter is left behind, or is giving an apparent westward motion, till the Gulf of Mexico is again reached and the circle is completed. During the Creation the land appeared on the margin of, and between, the circles; in proof of which the pointing of the three southern continents to the south east—features first pointed out by Humboldt—the accumulation of lands toward the north, rather than the south, and the direction of the glacial markings during the drift period—these all bear witness to and are explained by this theory.—*Mechanics' Mag.*, Jan.

RATS AND THEIR SAGACITY.

Among many instances of these, the following may be worth recording:—Captain ——, one of the passengers to Bombay in the Peninsular and Oriental steamship Jeddo, 1862 (since wrecked), missed several small articles from his cabin table—his toothbrush, a bunch of keys, and several other things. The peculation being continued, his suspicion fell upon the steward, until one day some things tied with a long string were taken. This string the captain found hanging over the corner of a beam near the ceiling of the cabin, and following the clue, discovered a varied assemblage of his missing things and others. His keys, toothbrush, &c., were recovered, but some of the articles had been carried out of reach. That rats had stolen them was proved by some papers being nibbled up to form their nests no doubt. Another instance occurred in a store-room in Ireland some few years since. Butter and eggs, &c., were missed, which led to the place being watched, and it was discovered that some rats had fixed their dwelling in the stopping of a chimney, stuffed, just above the fire-grate, with old carpets, &c. In these a store-house had been formed, and several pats of butter were found neatly placed together; while in another direction were a number of eggs, some bones, and meat. As the nest was two feet or so from the ground it became a question how the rats succeeded in getting the eggs into it; so means were used to observe, and our informant soon saw the thieves at work again. A basket containing something not for them was hung by a cord from a horizontal bar, along which one crept, cut the string, and when it fell, they all commenced to rifle it, carrying off the contents. Now, however, some eggs, placed in their way, attracted attention, and the mystery of the transport was solved. One fellow, throwing himself upon his back, clasped an egg firmly between his claws clinging to it with all four legs, while his companions triumphantly dragged him and his egg up into the nest. Rats will cut through lead pipes to get at water; yet sailors who tame them so that they come to a call or whistle, say that they never cut through a ship below the water line, lest their home should sink. Indeed, we have heard of one which, choosing to leave his ship by going through her side; and, as if aware that she was coppered to the water-line, made his exit through her planking within a couple of inches of the copper. Such tales as these would almost incline one to believe in a tale which was told as true, of a thirsty rat, having got upon the edge of a jar, the water in which was just beyond his length of neck, promptly reversing his position, he let his tail down into the vessel, then withdrawing it, licked the water off, and repeated the operation.—*Land and Water*, Jan. 12.

The Indian Bear.

The bear, like other wild animals noxious to man, is, for its own safety, obliged to roam about in search of food at night. But it will commence its rambles at sunset, unless too near human habitations, and is of a more open and fearless nature than other feræ. I have often watched them from a moderate distance in quiet places, open glades in forests, of turf scattered over with bushes, during the brief twilight of an Indian evening. They then move busily about; sometimes a grown-up couple, sometimes a she bear with one or two half-grown cubs, silently eating the bairberries, or if they come across an anthill, vigorously scratching up the soil and sucking the ants out of their cells with loud puffs that may be heard of a still evening for nearly half a mile. Their senses seem at all times rather blunt, and I have frequently found them on these occasions approach me to within fifty or sixty yards, unconscious apparently, of my presence. When they perceived me they would pull up at once with an abrupt snuff, or snort, sometimes rear, give a short, angry puff, and then, dropping on all fours, turn suddenly round and make oft in a lumbering gallop, occasionally stopping and looking round, and then, with a peculiar barking moan, as if protesting against all intruders, continuing their retreat into the jungles. It is not always, however, that they depart so peaceably; they will sometimes, after a partial retreat, appear to think better of so quietly relinquishing the ground, and return moaning and barking, stopping and rearing, and shaking their huge shaggy heads, and at last perchance fairly charging at the observer with prodigious uproar, uttering loud, hollow grunts, which try the strongest nerves. Of course, a person venturing at such hours into places infested by bears is supposed to be well armed. A shot will usually turn one, but not always, and should both barrels fail to do so, there is nothing for it but to exercise the better part of valour and take to one's scrapers. Happy he, at such a moment, whom Nature hath endowed with a light pair of heels.—*Field*, Jan. 5.

Man's Work and Waste.

Suppose a chamber with walls of ice, through which a current of ice-cold air passes, the walls of the chambers will of course remain unmelted. Now, having weighed a healthy living man with great care, let him walk up and down the chamber for half an hour. In doing this, he will obviously exercise a great amount of mechanical force; as much, in fact, as would be required to lift and push his weight through the distance which he has raised himself at every step, and transported himself by all his steps. But in addition, a certain quantity of the ice will be melted or converted into water, showing that the man has given off heat in abundance. Furthermore, if the air which enters the chamber be made to pass through lime-water, it will cause no cloudy white precipitate of carbonate of lime, because the quantity of carbonic acid in ordinary air is so small as to be inappreciable. But if the air which passes out is made to take the same course, the lime water will soon become milky, from the precipitation of carbonate of lime, showing the presence of carbonic acid, which, like the heat, is given off by the man. Furthermore, even if the air be quite dry as it enters the chamber, that which is breathed out of the man, and that which is given off from his skin, will exhibit clouds of vapour: which vapour, therefore, is derived from the body. After this experiment has continued for a longer or shorter time, let the man be released and weighed once more. He will be found to have lost weight. Thus, a living active man constantly exerts mechanical force, gives off heat, evolves carbonic acid and water, and undergoes a loss of substance.—*Huxley's Elements of Physiology*.

Coral Fishery.

Coral is obtained in large quantities in the Mediterranean. The French have, from time immemorial, carried on the fishery for this precious zoophyte off the Algerian coasts. Coral is also an important branch of industry and commerce in Italy. That which is obtained from the Sardinian coasts is chiefly found in the shallow waters near Carloforte; Alghero, a province situated on the west coast of the island; and the island of Maddalena. At Alghero, where the growth of coral is the most plentiful, it may be estimated that 190 vessels, of which 150 are Neapolitan, 20 Tuscan, and 20 Sardinian—manned by 1,930 sailors—are employed in this fishery, which begins in the month of March, and ends during the month of October. The rose coral, which is the most prized, is sold at very high prices, as it is entirely a fancy article. £80 was paid a short time ago for a piece of uncommon beauty weighing nine ounces. The ordinary price is about £24 per kilogramme. The price of red coral is about £6 per kilogramme. The white coral, the quality of which is often deteriorated by being worm-eaten, is sold at about £2 8s. per kilogramme, and the *ferraglio* at 5s. per kilogramme. The greater part of the coral is brought to Torre del Greco, near Naples. The Sardinians and Tuscans send the produce of their fishery principally to Genoa and Leghorn. The value of the coral obtained each year amounts to £60,000. From this must be deducted £45,800 to defray the expenses of the fishery, so that there remains a net profit of £13,000.—*Journal of the Society of Arts*, Jan. 5.

DIATOMACEÆ.

Nowhere is ornament more richly given, nowhere is it seen more separate from the use, than in those organisms of whose countless millions the microscope alone enables a few men for a few moments to see a few examples. There is no better illustration of this than a class of forms belonging to the border-land of animal and vegetable life called the *Diatomaceæ*, which, though invisible to the naked eye, play an important part in the economy of nature. They exist almost everywhere, and of their remains whole strata, and even mountains, are in great part composed. They have shells of pure silex, and these, each after its own kind, are all covered with the most elaborate ornament—striated, or fluted, or punctured, or dotted in patterns which are mere patterns, but patterns of perfect, and sometimes of most complex beauty. No graving done with the graver's tool can equal that work in gracefulness of design, or in delicacy and strength of touch. Yet it is impossible to look at these forms—in all the variety which is often crowded in a single lens—without recognising instinctively that the work of the graver is work strictly analogous—addressed to the same perceptions—founded on the same idea—having for its object the same end and aim. And as the work of the graver varies for the mere sake of varying, so does the work on these microscopic shells. In the same drop of moisture there may be some dozen or twenty forms, each with its own distinctive pattern, all as constant as they are distinctive, yet having all apparently the same habits, and without any perceptible difference of function.—*Duke of Argyle's Reign of Law.*

USES OF A GROUND VINERY.

In the largest gardens in the land they will be found most useful during our wretched winters and cutting springs for the protection of such stuff as small salading, &c., and not a few other uses which will soon suggest themselves to the amateur when once he makes the acquaintance of this simple ground vinery. Parsley, for instance, is often taken up and potted, to ensure having a supply in case of hard weather; but placing one of these over it will quite suffice for the usual run of our winters, while numerous batches of seedlings and half hardy things will be the better for their protection; and of course they may be taken off the vines when they have had their fruit removed and wood ripened in autumn, if it be desired to do any of these things with the ground vinery. Passing through the grounds of a large market grower of strawberries on the south side of London the other day, we observed Black Prince, the earliest kind, planted three rows rather close together, not more than 8in. between them, and then an alley of 15in. or so left between each set of rows. This grower sells his Black Prince strawberries very early at a high price; but he or anybody else may very nicely accelerate the earliest variety by placing one or more ground vineries over the rows, which their size just adapts them to fit. They seem, in fact, as well adapted for gently forwarding the strawberry as for the sure fruiting of good grapes without artificial heat; and most people will agree with us that the longer we can prolong the season of the strawberry the better. Lettuce, and endive too, in winter will be very thankful for the protection, and, with the aid of the ground vinery (by keeping snails and such vermin from devouring them), we may enjoy salad, which in winter is usually only for those who have pits and frames to spare, and who, moreover, manage them well.—*Field*, Jan. 5.

LOCUSTS.

I have just noticed "Firefly's" note on "the Carob tree, or St. John's bread," in *Land and Water* of December 8, *apropos* of which I send you the following extracts on the subject of locusts and the carob tree. The first is taken from Dr. Thomson's very interesting work on the Holy Land, entitled "The Land and the Book." Dr. Thomson is an American missionary, living at Beirut. His work is based upon twenty-five years' experience in Syria and Palestine. He thus writes:—"Do you suppose that the meat of John the Baptist was literally 'locusts and wild honey?' Why not? By the Arabs they are eaten to this day. The perfectly trustworthy Burckhardt thus speaks on this subject:—'*All* the Bedouins of Arabia, and the inhabitants of towns in Nejd and Hedjary, are accustomed to eat locusts.' 'I have seen at Medina and Tayf *locust shops*, where these animals were sold by *measure.* In Egypt and Nubia they are only eaten by the poorest beggars.' 'The Arabs, in preparing locusts as an article of food, throw them alive into boiling water) with which a good deal of salt has been mixed. After a few minutes they are taken out and dried in the sun; the head, feet, and wings are then torn off; the bodies are cleansed from the salt and perfectly dried, after which process whole sacks are filled with them by the Bedawin. They are sometimes eaten boiled in butter, and they often contribute materials for a breakfast when spread over unleavened bread mixed with butter.' Thus far Burckhardt. Locusts are not eaten in Syria by any but the Bedawin on the extreme frontiers, and it is always spoken of as a very inferior article of food, and regarded by most with disgust and loathing, tolerated only by the very poorest people. John the Baptist, however, was of this class, either from necessity or election. He also dwelt in the desert, where such food was, and is still used; and therefore the text states the simple truth. His ordinary 'meat' was dried locusts, probably fried in butter, and mixed with honey, as is still frequently done."—*Land and the Book*, part ii., pp. 419, 420.—*Land and Water*, Dec. 29.

New Books.

[*Our limited space must of necessity compel us to give but very short notices of new books, but they will perhaps serve as a guide as to what books our readers may ask for at their libraries.*]

Geology for General Readers: a Series of Popular Sketches in Geology and Palæontology. By David Page. Second and Enlarged Edition. (Blackwood and Sons.)

This is a second and improved edition of a little work that has already taken the position of best elementary work on geology for students. Most of our readers have no doubt an old acquaintance with it; for those who have not it is only necessary to say that the arrangement is so admirable, and the language so felicitous, that the increasing number of persons who are making this science their study cannot rise from an attentive perusal without feeling a still deeper interest in it.

The additions made to the present volume consist of a short chapter on the Origin of Veins, another on our Coal Supply, and several pages on Metamorphism, the introduction to which we subjoin :—

This conversion, or *metamorphism*, as it is technically termed, by which chalk, for example, can be changed into crystalline marble, or clay into glistening roofing-slate, forms one of the most abstruse problems in geology. As it is often referred to in geological writings, it may be of use to the general reader to indicate the principal causes which seem to be concerned in its production. These are—1. *Heat by contact*, as when any igneous mass, like lava, indurates, crystallizes, or otherwise changes the strata over or through which it passes. 2. *Heat by transmission, conduction, or absorption*, which may also produce metamorphism, according to the temperature of the heated mass, the continuance of the heat, and the conducting powers of the strata affected. 3. *Heat by permeation* of hot water, steam, and other vapours, all of which, at great depths, may produce vast changes among the strata, when we recollect that steam, under sufficient pressure, may acquire the temperature of molten lava. 4. *Electric and galvanic currents* in the stratified crust, which may, as the experiments of Mr. Fox and Mr. Hunt suggest (passing galvanic currents through masses of moistened pottery clay), produce cleavage and semi-crystalline re-arrangement of particles. 5. *Chemical action and reaction*, which, both in the dry and moist way, are incessantly producing atomic change, and all the more readily when aided by an increasing temperature among the deeper seated strata. 6. *Molecular arrangement by pressure and motion*—a silent but efficient agent of change as yet little understood, but capable of producing curious alterations in internal structure, especially when accompanied by heat, as we daily see in the manufacture of the metals, glass, and earthenware. Such are the more general and likely causes of rock metamorphism; and as it is possible that several of these may be operating at the same time, the reader will perceive that no hypothesis that limits itself to any one agent can be accepted as sufficient and satisfactory.

Scientific Works published in England and America during the Year 1866.

In a literary supplement issued with the *London Review* for Jan. 5, 1867, the following interesting account of scientific works published during the past year in England and America is given :—

We have had two volumes of Professor Owen's work on "The Anatomy of the Vertebrates," including fishes, reptiles, birds, and mammals; Mr. Samuel Laing's "Prehistoric Remains of Caithness," to which Professor Huxley has added notes on the human remains of that district; Lieut.-Colonel Forbes's "Early Races of Scotland, and their Monuments;" a translation of Dr. Ferdinand Keller's work on "The Lake Dwellings of Switzerland;" Dr. Hartwig's "Harmonies of Nature, or the Unity of Creation;" Mr. Charles Bray's work "On Force and its Mental and Moral Correlates;" Mr. Evan Hopkins's "Geology and Terrestrial Magnetism;" a further volume of the "Memoir of the Geological Survey of Great Britain;" translations of M. Louis Figuier's "World before the Deluge" and "Vegetable World;" Professor Stephens's "Old Northern Men of Scandinavia;" Sir John Herschel's "Familiar Lectures on Scientific Subjects;" and Mr. Fairbairn's "Treatise on Iron-Shipbuilding" and "Useful Information for Engineers," the latter consisting of lectures on the applied sciences, with treatises on the merits of the Paris and London International Exhibitions, the Atlantic Cable, the effect of impact on girders, &c.

Among works of science in America one of the earliest of the year was by Professor Agassiz on "The Structure of Animal Life," which, although it presents nothing new to the adepts of science, is a remarkably clear statement for the ordinary student of the Principles of zoological classification. "Geological Sketches," from the same distinguished naturalist, is a finely-illustrated volume of 311 pages. In both of these works the Professor repeatedly expresses his dissent from the theory of Mr. Darwin. Of the opposite school is Professor Clark, of the same University (Harvard) as Agassiz, who has given to the world a work of originality and learning, under the title "Mind in Nature; or, the Origin of Life, and the Mode of Development of Animals." The author holds that the old doctrine *Omne vivum ex ovo* is exploded by the fact of the origination of some animals by budding and self-division, and defends the theory of spontaneous generation. "Coal, Iron, and Oil, or the Practical American Miner," &c., &c., is the joint production of Messrs. Daddon and Bannan, who are both well acquainted with their subject, and have given a comprehensive account of the statistics, &c., of mining in America for thirty-five years. With this may be mentioned a "Special Report on Coal," by S. H. Smeet. Mr. Smeet estimates the coal resources of North America at 7,669,900,000,000 tons. "New Physiognomy," &c., by S. R. Wells (containing more than 1,000 illustrations), is a valuable book, as giving a complete encyclopædic account of nearly all that has been thought and said on this shadowy science from the time of Lavater. "Comparative Physiology, or Resemblances between Men and Animals," by J. W. Redfield, M.D., (with 300 illustrations), is a very curious book, and one of much research. We must pass over several scientific works of value. From the Smithsonian Institution we have received during the year among many useful publications, "Check List of the Invertebrate Fossils of North America, Eocene and Oligocene," by T. A. Conrad; "Check List of the Invetebrate Fossils of North America, Cretaceous and Jurassic," by F. B. Meek; "New Species of North American Coleoptera, by J. L. Leconte, M.D.; and from Philadelphia, "Observations upon the Cranial Forms of the American Aborigines, based upon Specimens contained in the Collection of the Academy of Natural Sciences in Philadelphia," by J. A. Meigs, M.D.

The bookseller gives the number classified published in England as follows:—

Medical and Surgical	160
Travels, Topographical and Geographical	195
Agriculture and Horticulture	64
Science, Natural History, etc..........	147

The Journal of Anatomy and Physiology. No. 1, November, 1866. London: Macmillan.

This is the first number of a new quarterly journal devoted to the study of anatomy and physiology. It is conducted by G. M. Humphry, M.D., F.R.S.; Alfred Newton, M.A., F.L.S.; William Turner, M.B., F.R.S.E.; E. Perceval Wright, M.D., F.L.S.; and as Editor, J. W. Clark, M.A.

The first number is very rich in subjects of interest—containing an address on Physiology, by Prof. Humphry; the Anatomy of the Cornea, by Dr. Lightbody; the Comparative Anatomy of the Muscles of the Shoulder, by Mr. Wood; the Human Crania, by Prof. Huxley; on the Gestation of Arius, by Mr. Turner; Variation in Buccal Nerve, by the same; the Action of Muscles, by Dr. Cleland; the Retina of Amphibia, by Mr. Hulke; Amylotic Ferments, by Dr. Foster; Rigor Mortis, by Dr. Harris; together with reviews, analytical, critical and other notices, letters, etc., etc.

The Heavens. An Illustrated Hand-book of Popular Astronomy. G. Amedée Guillemin. Edited by Norman Lockyer, F.R.A.S., &c. London: R. Bentley.

A second edition of one of the most complete and useful treatises on the science of astronomy. It has been highly praised and recommended by M. Leverrier, Director of the Imperial Observatory in Paris, Mr. Warren de la Rue, of the Royal Astronomical Society, and Sir J. Herschel—names a sufficient guarantee of its merit. The author says:—"In order to make astronomy accessible to all, it is necessary to banish from the work the mathematical portion of the science, which forms the essential element in the special treatise on the subject. But, on the other hand, the most interesting details relating to the con stitution of worlds which people space, the more recent observations made by the magnificent instruments now erected in the observatories of Europe and America, occupy a large place in the physical description of the universe."

Lecture Notes for Chemical Students, embracing Mineral and Organic Chemistry. By Edward Frankland. Van Voorst.

The above seems to be an accurate outline of the author's lectures delivered at the Royal College of Chemistry, and consists principally of chemical formulæ. It is likely to be of great interest to many.

The following works likely to interest our readers have appeared during the past few weeks:—

The Art of Fishing, on the Principle of Avoiding Cruelty. By the Rev. O. Raymond, LL.B. Longmans & Co.

Familiar Lectures on Scientific Subjects. By Sir J. Herschel, Bart. Strahan.

Revue des Cours Scientifiques de la France et de l'Etranger. Germer. Ballière.

Chemical Handicraft. By John Joseph Griffin. Griffin and Sons.

The Elements: an Investigation of the Forces which determine the Position and Movements of the Ocean and Atmosphere. Vol. I. By W. L. Jordan. Longmans & Co.

A First Book of Botany, for the Use of Schools and Private Families. By William Rossiter. Allman.

An Elementary Treatise on Heat. By Balfour Stewart, LL.D. Oxford: Clarendon Press.

A History of Geography—[*Geschichte der Erdkunde*, von Oscar Peschel]. Munich Cotta. London: Nutt.

A Dictionary, Geographical, Statistical and Historical, of the various Countries, Places, and Principal Natural Objects in the World. By. J. R. M'Culloch. New edition, carefully revised by Frederick Martin. Longmans and Co.

The Student's Text-Book of Electricity. By Henry M. Noad. Lockwood and Co.

Terrestrial and Cosmical Magnetism. The Adams Prize Essay for 1865. By Edward Walker, M.A. Bell & Daldy.

Correspondence.

[*Under this head we shall be glad to insert any letters of general interest.*]

WHAT ARE SHOOTING STARS?

SIR,—I cannot at all agree with "A Country Rector" in considering shooting stars as merely gaseous bodies, and in doubting the theory of the regular orbits and periodic revolutions of aërolites. The very fact of the periodic recurrence of the fiery showers, often upon the same night, seems to prove that, as they are met with in certain portions of space at stated periods, they must be controlled by some fixed laws, and proceeding upon some regular orbit. Curiously enough, in the very number in which "A Country Rector" expressed his incredulity concerning the regular movements of the "clouds of stones," as he calls the meteors, a passage from Herschel's "Familiar Lectures" is quoted, which speaks of the "*ring of meteorolites, which astronomers more than suspect.*" Surely the name of Herschel carries weight on any matter pertaining to astronomy. "A Country Rector" bases his denial of the solidity of shooting stars upon three points; *i.e.*, the failure of the spectrum analysis to dissect their light, and discover in it traces of solid matter; the supposed general fact that shooting stars never fall to the ground; and the secondary one that none of them did fall on this particular November night.

As to the first objection, I suppose it would be extremely difficult to apply the analysis to the light of so fugitive a body as a meteor, which rarely remains in view more than a few moments: but if it could be done, probably the case would remain analogous to that of the comets, the larger ones showing traces of a solid nucleus, but the smaller seeming to be merely gaseous. I dispute the fact that shooting stars never fall to the ground. "A Country Rector" attempts to place meteors upon a different footing by calling them "isolated," but this is by no means a distinguishing characteristic of falling stones, for several instances of *showers* of these bodies exist; that, for instance, at L'Aigle, in Normandy, in 1803, when two or three thousand aërolites fell over an extended area. Indeed, the dark cloud from which these falling stones invariably debouch would, it is strongly suspected, be luminous by night, and thus a fall of many of these would present the exact appearance of a fall of shooting stars.

Finally, "A Country Rector" illustrates his assertions by citing the night of the 13th of last November, in which he states that no solid bodies fell. The unaccountable case of the policeman drowned in Loch Katrine on the night of the display has been plausibly explained by supposing the man to have been struck by some falling stone, and if this surmise were capable of proof it would rather invalidate the argument; but of course the shooting stars which come to the ground as meteors are the exceptions, and not the rule. I would venture to suggest that they are generally reduced to powder by the fierceness of their combustion, and shed on our earth in imperceptible powder, only the very large ones reaching the earth, and then in a mutilated and incandescent state. The ignition of meteors cannot be explained wholly by atmospheric causes, but is probably owing rather to electric and magnetic agency, since the height at which many of them are seen is far superior to that of the earth's atmosphere.

I am, &c., &c.,

F. A. A.

HABITS OF THE SQUIRREL.

SIR,—Perhaps no department of natural history is of so much popular interest as the one which relates to the habits of animals. But the very popularity of this interest admits of a motive for fallacy, since exaggeration seems to add season to the dish; and with people cultivating a taste for reading, what is wonderful or out-of-the-way catches attention more readily than what modestly and soberly fits into all the other facts of the case.

There has reached me for perusal a book entitled the "Young Reader," published by Nelson and Sons. At page 93 there is a pretty enough picture of grey squirrels crossing a river, each on a canoe of its own launching, the material being the bark of a tree, "with their bushy tails spread out to catch the wind." The "lesson" accompanying the picture relates the story as if it were a common enough occurrence, and with no remark in the least modifying the extraordinary statement. Then follows a poem, by Mary Howitt—a nice poem in its way—containing the same assertions, and attempting to engrave them on the young mind by the aid of rhyme.

I have traced the story back to *Goldsmith's Earth and Animated Nature*, where it is given on the authority of Linnæus, but highly-respectable modern articles on the squirrel do not mention the habit. One of the most characteristic of man's inventions is that whereby he masters the waters:—

> "He made him a boat of a hollow tree,
> And man became lord of the awful sea."

When I am told the squirrel is in possession of a secret so important for the dignity of our species, I naturally regard the statement with some degree of credulity, and don't at all feel disposed to stamp it as an indubitable fact, or allow it quietly to drop, like an acorn in a crevice, on the fruitful soil of a young child's mind. I wish to know if any of your readers could help me either by confirming so remarkable a circumstance or by exploding it.

SCHOOLMASTER.

Dumfriesshire, 7th Jan., 1867.

THE HORSE CHESTNUT.

SIR,—Referring to a "Note" in No. 1 of the *N. N. B.*, upon the etymology of "Horse Chestnut," it seems to me that the name *Horse* Chestnut was employed merely to indicate its strong, astringent flavour, and consequent fitness for horses and other cattle, in contradistinction to the "Sweet Chestnut" eaten by man, and perhaps given by our forefathers from a notion that horses really ate them as cows and deer do.

To show the plausibility of this derivation, I can point to "Horse Radish" as one instance where the prefix "Horse" is used to indicate strength and coarseness of flavour; and possibly others might be found.

While on the subject of derivation, I shall be glad to have the opinions of any of your readers on the origin of other of our popular names—among others of Gooseberry, Strawberry, Raspberry, Cranberry, Whortleberry, &c.

That all these names and probably most popular descriptions when given were eminently descriptive and characteristic I have no doubt—Blackbird, Blackberry, Dewberry, for example, but corrupted in spelling and pronunciation in coming down to us; and it is only reasonable to suppose that the names of doubtful origin are so to us only because of corrupted orthography, or because the descriptive prefix has now become obsolete as a separate word, and thereby its meaning and force are hidden from us in these days.

I have ideas of my own on the derivation of some of the words named in my query, but shall nevertheless be pleased to hear what some of your correspondents may say about them.

I am, sir, yours respectfully,

W. H. ADE.

Worcester.

TO CORRESPONDENTS.

W. Q. Cubitt—Many thanks for your kind wishes. You will see the advertisements are not paged in the present number; it was noticed in No. 1, but too late.

William Clark—See answer to W. Q. Cubitt.

F. Wilkinson—We approve your suggestion, but think it advisable to wait a few months.

D. E. S.—There is a long article upon the subject in *Land and Water, Nov.* 24, but no mention is made as to where the experiments took place.

R. W. T. S.—There are several respectable men in Leadenhall Market, who will give you all particulars. We know of no work on the subject.

Short Notes.

THE RHINOCEROS.—The Rhinoceros of the Terai appears to be somewhat larger than the same animal as found in the Rajhmahall Hills and the Bengal Soonderbunds, but I much doubt his being of a different species. As this rare and interesting animal does not appear to be well known in Europe, a few remarks on his appearance, character, and habits may not be out of place. The Indian Rhinocerus (Rhinoceros Indicus) is at least as large as his African brother, whether white or black: but the "horn," as it is generally but erroneously called, is much shorter in the Indian than in the African variety, and is composed not of horn, but of numerous small hairs, forming a hard compact protuberance growing from the thick skin of the snout, and which, so far as my experience goes, is seldom more than a foot in length. The stature of this singular animal is not nearly so great as that of the elephant, but in girth and in the colossal thickness of his limbs he is nearly equal to the latter, and in the combats which not unfrequently take place between these monsters the rhinoceros is said to be usually the victor. The rhinoceros is a stupid, solitary, and ferocious animal, and loves to haunt the deepest and most mysterious depths of swamps and thickets, where he feeds on the young roots of trees, leaves, &c. His great strength, and the thick armour plates which protect his shoulders and haunches, render him almost invincible against the attacks of any other denizen of the forest, and he seems to treat the rest of the *færœ naturæ* with a sort of calm disdain; but when once his haunts are invaded he becomes enraged at the slightest sound, and woe to the luckless wight who is within reach of his irresistible charge. The hearing of this animal is wonderfully acute, but his little pig-eye, has but a limited range of vision, and in favourable situations, and by the exercise of great caution, he may be stalked. In the Terai, however, he is generally shot from the backs of elephants. No timid man should ever try to shoot rhinoceros on foot; the work is fearful, and the danger very great. In a state of captivity this strange animal is easily tamed, and becomes as remarkable for docility as he was when in a wild state of ferocity—*Field*, Dec. 22.

NATIVES ON THE ZAMBESI.—They were magnificent fellows, but had the look of unmitigated savages. They wore a kind of kilt made of monkey skins, and their loins were covered with strips of monkey skin and buckskin alternately arranged. It is a far more picturesque attire than the bit of dirty calico I had hitherto seen worn by the natives. Their necklaces were made mostly of the horns of a diminutive antelope, strung through the roots, though one fellow, the medicine man, had a forest of chips about his neck. He also had at least twenty bracelets of steel wire on each arm, and on the fingers of each hand were many rings of the same material. Their snuff-boxes were made of a section of bamboo or reed; they were about a foot long, an inch in diameter, and ornamented with elaborate carving, very skilfully executed. One man carried his snuff-box in a hole made in the lower lobe of his ear. They were well pleased with their visit to us, for Dr. Livingstone conversed with them freely, and gave them trifling presents. There was nothing servile in their bearing; indeed, they regard all the natives around as their servants and slaves. They do no work, but quarter themselves upon the tribes they have subjugated. Those who visited us were, with many others, living upon the villagers near to Shupanga, and they assumed the air and manners of lords and masters. They carry off the stalwart lads as recruits, and the young women as wives. The Portuguese are really unable to do anything with them. Once, when repelling an invasion of these people, they captured two of them, and carrying them to Quilimaine, did their best, by flogging, &c., to subdue their spirit. But they only evoked threats of vengeance and defiance. Until death they breathed out threatening and slaughter against their captors. They were as little moved to supplication as the North American Indian.—*Rowley's Story of the Universities' Mission to Central Africa.*

BIRDS IN CHINA.—Their mode of taming is somewhat quaint and peculiar, being effected by dipping the bird into a pail of cold water, holding it at the same time carefully in the hand. After this process, whether from the shock of the sudden immersion and cold, or from a feeling that the hand of its owner has protected it from danger, it seems to be quite under control, and ceases to attempt its escape from the cage, or to be the least afraid of the human face and voice. It will ere long be taught to know its master's call, and after enjoying full liberty in the open air for hours, will return instantly at the sound of his voice. The golden oriole is a tenant of the northern woods, as are also several varieties of the thrush tribe (one of which was brought to England by Mr. Fleming), the blue-throated warbler, the gorget warbler, the red throat, and the North China lark. The latter is a good mimic, and when it has been educated to imitate successfully the mewing of a cat, it is considered highly accomplished, and will command a high price. It is called the pe-ling, or "hundred-spirited bird," and to the poorest Chinese, its sweet natural strains, which are lively and constant, will afford amusement and consolation in the midst of many hardships and sorrows. The crying thrush too, is highly prized, and when pouring out its evening ditty, which is peculiarly sweet at the fall of day, a melodious concert may be frequently enjoyed, for the owners of these birds love to bring them together in competition, and many delighted hearers will assemble to listen to the simple harmony.—*Land and Water, Jan.* 5.

THE REINDEER.—The ease with which the reindeer makes its way through the masses of snow is wonderful. It seems scarcely credible that so small an animal can wade up to its belly in the snow, and yet be able to drag a pulk containing a good weight (I am fourteen stone without my boots) after it. Often my pulk would sink so deep that it was exactly as if one was passing through a snow cutting, the sides of which towered far above one's head. Often, too, it made me grieved to see what hard work it was for the poor patient beast, and yet how obediently it would obey the rein attached to its left horn—how meekly it would receive a whacking, giving utterance perhaps to a grunt, while its tongue would hang down out of its mouth—a sure sign of distress. To say nothing of their numberless enemies in the summer, in the shape of all kinds of insects, and not to speak of their winter foes, the wolves, it is often terribly hard work for them to provide provender during this latter season; for the moss on which alone they feed is frequently at a depth of several feet below the surface of the snow, and this they have to scratch on one side, and bore a deep hole till they find it; and it frequently happens that when they have worked hard for a length of time, their mining operations prove fruitless, for there is no moss. But the young calves, how do they manage? They are not strong enough to scratch the snow aside, like the old ones; so they stand around, waiting for the pieces of moss to be scratched up, which the old deer in its burrowing scatters, far and wide. —*Chambers's Journal,* Dec. 29.

WHY BIRDS FLY.—In the first place it is remarkable that the force which seems so adverse—the force of gravitation drawing down all bodies to the earth, is the very force which is the principal one concerned in flight, and without which flight would be impossible. It is curious how completely this has been forgotten in almost all human attempts to navigate the air. Birds are not lighter than the air, but immensely heavier. If they were lighter than the air they might float, but they could not fly. This is the difference between a bird and a balloon. A balloon rises because it is lighter than the air, and floats upon it. Consequently it is incapable of being directed, because it possesses in itself no active force enabling it to resist the currents of the air in which it is immersed, and because, if it had such a force, it would have no fulcrum, or resisting medium against which to exert it. It becomes, as it were, part of the atmosphere, and must go with it where it goes. No bird is ever for an instant of time lighter than the air in which it flies; but being, on the contrary, always greatly heavier, it keeps possession of a force capable of supplying momentum, and therefore capable of overcoming any lesser force, such as the ordinary resistance of the atmosphere, and even of heavy gales of wind. The law of gravitation, therefore, is used in the flight of birds as one of the most essential of the forces which are available for the accomplishment of the end in view.—*Duke of Argyle's Reign of Law.*

STARS.—Prof. Zollner, of Leipzig, who has been working at some of the most important questions which have of late occupied the attention of astronomers, finds from his photomeric investigations that the star *a* Centauri seems to be equal to our sun. If the sun were at such a distance that 3¾ years would be required for its light to travel to the earth, it would then appear similar to Capella, and have a parallax of 0·874 seconds. Consequently, if light undergoes no absorption in its passage through space, the light of Capella must be much more abundant and intense than that of the sun. Data are given for a comparison of intensities, and of the reflection from different terrestrial and artificial surfaces; and the Professor throws out certain theoretical views which will, perhaps, be put to the test by those who have watched the recent progress of cosmical science. Every star-sun, to use his own term, has a history divisible into five periods; the glowing gaseous, the glowing liquid, the slag, the eruption, and the complete refrigeration period. Then applying this theory to actual phenomena, he finds the first period represented by planetary nebulæ; the second, by the invariable stars; the third, by our sun; the fourth, by new stars; and the fifth, by Bessel's dark stars. All the periods may be traced in the cosmical history of the earth. The non-planetary nebulæ occupy a place between the first and second periods. The third, or slag period, is that in which a cool non-luminous surface was developed; and in the fourth, or eruption period, the surface was vehemently disturbed and broken up by frequent outbursts of heated matter from the interior.—*Athenæum*, Dec. 29.

EQUATORIAL AFRICA.—Equatorial Africa for about ten degrees on both sides of the Line, and nearly quite across the Continent, still remains almost a blank unknown to explorers. One brilliant track has, within the last ten years, been broken through this vast belt. It is the route between the East Coast and the Nile, advocated by Dr. Beke in 1846; and pursued under the direction of the Royal Geographical Society, by Burton and Speke in 1857-8, from Zanzibar to Lake Tanganyika, and by Speke alone to Muanza. Again in 1860-63, Speke and Grant penetrated along the same track to Kazeli, and onwards to the Nile. In the reverse direction, Mr. and Mrs. (now Sir Samuel and Lady) Baker, ascending the Nile with supplies for Speke and Grant, met them at Gondokoro; and pushing on against desperate obstacles, forced a passage southwards, until they discovered the great Lake Albert. Between the great lakes and the confluence of the Sobat on the north, some western affluents of the Nile have been made known by Mdlle. Tinné, Mr. Petherick, M. Poncet, Dr. Penney, and other distinguished explorers. On the west coast, M. du Chaillu had made some progress towards the interior from the neighbourhood of the Gaboon, when he was compelled to retreat. On the east coast, Baron von Decken attempted to ascend the Jubb River, and was killed by the natives. Thus the Nile routes form the only important part of Equatorial Africa at present explored.—*Reader*, Dec. 29.

AN ATOM.—Let a man but know one single atom perfectly, with all the tendencies and forces animating and controlling it—and just as another who should know all the capacities and tendencies of a single human being might out of them construct the full idea of society, so he, pursuing all these forces to their natural results, would range at will through the whole circle of the sciences. He would have the key to all the secrets of astronomy, for they depend upon the law of gravitation, or attraction between atoms at a distance. He would have the key to all the phenomena of solids, liquids, gases—strength of material, friction, elasticity, and a hundred other subjects, for these depend upon the various attracting and repelling forces existing betweeen atoms near to one another. He would have the key to all the phenomena of growth, decay, and change of form and substance apparent, whether in living bodies or in inorganic substances, for these depend upon the chemical affinities and forces resident in atoms. He would have the key to all the phenomena even of electricity, I suppose, and magnetism, for these depend upon mysterious forces which can be studied only in connection with the atoms which they influence. And though he should not solve the question—What is life? he would approach the answer nearer than any other man, for knowing the behaviour of a living atom, and knowing all the forces which affect a dead one, he could discern with clearness, and separate, eliminate with accuracy all that was distinctly due to life alone. —*Gardener's Journal*, *Jan.* 12.

RATS IN AFRICA.—There are several species of rat, and the bewa, the field rat, a harmless looking creature, small in size, slender of form, and of the colour of lavender, is regarded by the natives as the best of all meat. At certain seasons of the year there is a regular rat harvest, the boys being the reapers. You see them coming home with dead rats on a reel, like larks on a skewer. They dry them, smoke them, and hang them up in bundles, like sprats at Billingsgate, and eat one now and then as a dainty. One evening my boy Juma (one of the boys now with Dr. Livingstone) came into my hut with his supper, a lump of Nsima, and something like a burnt sausage. "What is that, Juma?" said I. "Bewa," said he. "Is it good?" "It is good. Better than sheep, better than goat, better than bird or fish, better than all other meat. Shall I roast one for you?" And he pulled out a fine rat from his bag, and held it up for admiration. I nodded assent, and off he ran delighted. He returned with the rat frizzled and black, cooked to a turn. Its odour was savoury, but it was rat. and I hesitated, "Did you skin it, Juma?" "No." "Did you take the entrails out, Juma?" "No; they are the best of it—the fattest," said he, in surprise at my want of power to appreciate what a rat was. I did not taste it, though I afterwards thought myself weak to allow prejudice to interfere with my taste, for I have no doubt the boy was right, and that rat was pleasant food, and the method of cooking it was no worse than our method of dressing snipe."—*Rowley's Story of the Universities' Mission to Central Africa.*

THE SENSITIVE PLANT.—In a letter of Dr. Sigerson's to the *Athenæum*, he states that the folioles of the sensitive plant were touched by him with a non-conductor, and exhibited no movement. The sensitive plant is a common weed here, and is at present, as in his experiments, in flower. I touched it with glass, sealing-wax, iron, and the hand, and in all cases found the usual movement, which also took place when the plant was gently blown on with the breath. No such difference as, on any electrical hypothesis, we should expect, existed between the sensitiveness of the ends and middles of the folioles. Another fact about the sensitive plant, which the electrical theory does not explain, is the closing of the leaves at night. Perhaps the more hopeful question would be, not "why do they shut?" but "why do they open?" And I may be permitted to guess that the solar rays in the morning, or the solar diffused light, throws the molecules of the folioles into some new condition, the result of which is their opening, and that such a molecular condition is destroyed by the vibration caused by touch. What this molecular condition is, perhaps we shall never know, or, if ever, through miscroscopic analysis. Dr. Sigerson's observation, that children affect the sensitive plant more than adults, I confirmed by comparing the effects of my own touch with that of a child of seven years old, who affected the plant more powerfully than I could do.—W. E. HAMILTON.—*Athenæum*, Dec. 29.

THE SNOW LEOPARD.—The snow leopard is represented by Colonel Markham and Mr. Wilson as being found in considerable numbers in the upper parts of the mountains, but though tolerably numerous, it is so shy and cautious in its habits as to be very rarely seen. Mr. Wilson only shot one specimen, and that a half-grown cub, during his sojourn in the hills, which extended over a considerable period of time, and during which he collected nearly all the rarer Himalayan mammals and birds. The *Felis irbis* above referred to exists also, I believe, in some of the Persian mountain ranges, being most probably the animal alluded to by Tennyson in his exquisite poem of "Œnone," where he so accurately describes the deep yet muffled voice of the animal as being heard from the pine-fringed mountain glens during the twilight of early morning. This peculiar sound emitted by the leopard has heen noticed by the natives of Eastern Africa, who have a machine for grinding, or rather crushing corn, which causes a similar noise, and is called by the same name, "nyalugwé." The voice of the leopard consists of three or four loud, harsh growls, repeated rapidly in succession, more resembling the sawing of large, dry boards than anything else I can compare it to, while the jaguar of South America (*Felis onca*) commences by uttering a short roar like that of a tiger, followed by several grunts, dying away gradually in long-continued sighs. The puma (*Felis concolor*) on the contrary mews like a magnified tom-cat, there being none of the majesty and consciousness of physical power so conspicuous in the roar of the tiger or lion.—*Land and Water.*

NEW SIBERIA.—New Siberia and the Isle of Lakon are, for the most part, only an agglomeration of sand, ice, and elephant's teeth. At every tempest the sea casts ashore fresh heaps of mammoth tusks, and the inhabitants are able to drive a profitable trade in the fossil ivory thrown up by the waves. During summer innumerable fishermen's barques direct their course to this isle of bones, and in winter immense caravans take the same route, all the convoys, drawn by dogs, returning charged with the tusks of the mammoth, weighing each from 150lb. to 200lb. The fossil ivory thus obtained from the frozen north is imported into China and Europe, where it is employed for the same purposes as ordinary ivory, which is furnished as we know, by the elephant and hippopotamus of Africa and Asia. The isle of bones has served as a quarry for this valuable material for export to China upwards of 500 years, and it has been exported to Europe for upwards of 100 years; but the supply from these strange mines remains undiminished. What a number of accumulated generations does not this profusion of bone and tusks imply!—*Mechanics' Magazine.*

WAPITI.—There are few prettier sights to a naturalist than to watch a herd of wapiti, five or six in number (they seldom assemble in larger bands), browsing in some quiet gorge. The king of the herd, ever on the watch for the slightest sign indicating the approach of danger, twists about his long ears to catch the faintest sound, anon elevating his dewy nose, sniffs the breeze, to discover if it bears along with it the scent of a lurking foe. Round about him some of the does are lying down beneath the shadow of the trees, half hidden by the grass and wild flowers, whilst others are lazily cropping the succulent plants, or in dreamy enjoyment chewing the cud. Let a stick crack sharply beneath your foot, or a gust of wind blow from the hunter towards the herd, or a displaced stone go rolling down the hill-side, then, quick as thought, the antlered monarch sounds the shrill note of alarm, and leading off at a jog-trot, is at once followed by his wives and subjects.—*Leisure Hour*, Jan. 5.

THE DRIVER ANT.—Sometimes, as is usual in tropical countries, the rain descends like a flood, converting in a few minutes whole tracts of country into a temporary lake. The dwellings of the driver ant are immediately deluged, and, but for a remarkable instinct which is implanted in the insects, most of the ants, and all the future brood, would perish. As soon as the water encroaches upon their premises, they run together and agglomerate themselves into balls, the weakest (or the "women and children," as the natives call them) being in the middle, and the large and powerful insects on the outside. These balls are much lighter than water, and consequently float on the surface, until the floods retire and the insects can resume their place on dry land. The size of the ant balls is various, but they are on an average as large as a full-sized cricket ball. One of these curious balls was cleverly caught in a handkerchief, put in a vessel, and sent to Mr. F. Smith, of the British Museum, who has kindly presented me with several specimens of the insect.—*Homes without Hands.*

SOUND.—The waves of sound go only 377 yards in a second, while the earth itself goes eighteen and one-third miles, and light ten thousand times faster than that; while electricity (which again is probably another kind of vibration of the solid atoms of bodies, and certainly not a fluid) runs along a wire about half as fast again as light. So says Mr. Denison, in his "Astronomy without Mathematics," if the earth were a cannon ball, shot at the sun from its present distance, with the velocity it now travels with, and the moment of explosion telegraphed to the sun, they would get the telegram there in about five minutes, and see the earth coming in eight minutes, and would have nearly two months to prepare for the blow, which they would receive about fifteen years before they heard the original explosion. This is merely taking the sun as a target to be shot at, without regard to his power of attracting the earth at the final rate of 90 miles a second.—*Mechanics' Magazine.*

SAXONS.—The Saxons seem generally to have settled in the open country, not in the towns, and to have built timber halls and cottages after their own custom, and to have avoided the sites of the Romano-British villas, whose blackened ruins must have thickly dotted at least the southern and south-eastern parts of the island. They appear to have built no fortresses, if we except a few erected at a late period to check the incursions of the Danes. But they had the old Roman towns left, in many cases with their walls and gates tolerably entire. In the Saxon MS. Psalter, Harleian 603, are several illuminations in which walled towns and gates are represented. But we do not gather that they were very skilful either in the attack or defence of fortified places. Indeed, their weapons and armour were of a very primitive kind, and their warfare seems to have been conducted after a very unscientific fashion. Little chance had their rude Saxon hardihood against the military genius of William the Norman, and the disciplined valour of his bands of mercenaries.—*Art Journal*, January.

CENTIPEDE.—But a worse adventure befell an engineer of ours. He was doing duty in the stoke hole, when one of these loathsome creatures actually crept up under his pantaloons. He was an old sailor, and a cool, and he well knew that if he attempted to kill or knock it off, the claws would be inserted on the instant. Cautiously he rolled down his dress, and spread a handkerchief on his leg a short distance before the centipede, which was moving slowly and hesitatingly upwards. It was a moment of intense excitement, both for those around him as well as for the man himself. Slowly it advanced, once it stopped, then moved on again, and crossed on to the handkerchief, and the engineer was saved; on which he immediately got sick, and I was sent for, heard the story, and received the animal, which I placed beside the other.—*Chambers's Journal*, Dec. 22.

PLAGUE OF GRASSHOPPERS.—A curious story comes to us from across the Atlantic, nothing less than the stoppage of a railway train by grasshoppers. Letters from Kansas, U.S., refer to a widely extended and destructive plague of these destructive insects. Some idea of their numbers may be had from their taking three weeks to pass Lauenworth, in a stream about twelve miles wide and 300 miles long. And from another fact that, having got on the railroad track of the Union Pacific road in such numbers as to cause the wheels to slip on the rails, and the freight train at Wyandotte was detained several hours beyond its time by the impossibility of penetrating the massive crowd of the insects, the slipping of the engine wheels, and the almost total darkness caused by their numbers.—*Mechanics' Mag.* Dec. 22.

THE HEN AND DUCK.—A paper has been received by the Paris Academy of Sciences from M. Comaille on the comparative value of the hen and duck as egg producers. His observations were limited to three hens and three ducks, all fine animals, hatched at the same time in the month of February. During the following autumn the ducks laid 225 eggs; they recommenced laying in February, and continued to do so until the middle of August. The hens laid no eggs during the autumn, but began in January, and left off about the middle of August. The totals of each at the end of that time were—the hens, 257 eggs; the ducks, 617. M. Comaille next examined the nutritive value of each kind of egg, and found them nearly equal in that respect. Hence the duck is more profitable than the hen by far.

PLANTS AND BIRDS AT CHRISTMAS.—In south Devon, on the shortest days of 1866, there are violets and primroses plenty in bloom, snowdrops showing their buds, mignonette, tropæolum, canariensis, wallflowers, rhododendrons, scarlets and pinks in variety; humble bees and wasps humming and buzzing about the arbutus trees in flower; the wild wood bee, mason wasp, bluebottles, and other varieties of flies and gnats swarming about the ivy in blossom on the sunny side of old walls and trees. Our songsters are the missel thrush or stormcock, the common grey thrush, and the woodlark; while the hedge-sparrow, robin, and little jenny wren are also to be seen. Thermometer at five a.m., 45 deg., wind south.—JAS. BARNES, *Field*, Dec. 29.

SCORPIONS.—In my cabin, besides the common earwigs, which were not numerous, and were seldom seen, I found there were a goodly number of scorpions, none of which, however, were longer than two inches. I am not aware that they did me any particular damage, further than inspiring me with horror and disgust. It *was* very unpleasant to put down your hand for a book, and to find a scorpion beneath your fingers—a hard scaly scorpion; and then to hear him crack below your boot, and to be sensible of the horrid odour emitted from his body—these things were *not* pleasant. Those scorpions which live in ships are of a brown colour, and not dangerous; it is the large green scorpion, so common in the islands of East Africa, which you must be cautious in handling, for children, it is said, frequently die from the effects of this scorpion's sting.—*Chambers's Journal*, Dec. 22.

ATOMS IN A PIECE OF IRON.—M. A. Gaudin, who fancies that he has ascertained the exact forms of the molecules of many organic and of some inorganic compounds, believes that he has also determined the size and weight of the ultimate atoms of some of the elements. His calculation of the number of atoms in a piece of iron of the size of a pin's head will afford an example of his notions on this latter point. He makes the result twenty million times twenty million times twenty millions—a number expressed in 8 followed by twenty-one cyphers, and so inconceivably great that, as M. Gaudin points out, it would take two hundred and fifty years to count it, even at the rate of *sixty thousand millions a minute*, being at the rate of as many per minute as there are grains in fifty thousand bushels of barley. The atoms may be,—probably are,—as infinitely minute as this, but we may be excused for doubting the absolute accuracy of M. Gaudin's measurements of them.—*Mechanics' Magazine.*

THE EGYPTIAN FELLAH.—The size of a "fellah's" house varies from nine to eighteen feet square, and in height a little more than three feet. The sides of this hut are composed of marsh reeds, plastered with cow's dung, the top covering being a flat earthern roof; a hole in the reeds of about four inches diameter represents a window, and there is a large aperture typical of a door by which the fellah enters "on all fours." In this unpartitioned wigwam sleep the fellah, his wife (or wives) and children, and frequently his children's husbands or wives and their children. Here also about half a dozen fowls, and probably two or three goats, nightly seek shelter. The furniture is quite in keeping with the dwelling. The hallah (a kind of saucepan), three or four wooden spoons, a straw mat, a primitive Egyptian handmill used by the women in grinding Indian corn for food, the gulleh or earthen drinking vase, and a larger one for carrying water, as in the days of Rebecca; a rude cushion, a quilt, and a looking-glass the size of one's hand complete the inventory. There are no such things as village schools, and the fellah has no means of instruction within his reach, and consequently possesses no knowledge whatever beyond the animal instincts of a savage.—*Standard.*

BURROWING SPIDERS.—Many of the true spiders are among the burrowers; and even in our own country it is possible to see a sandy bank studded with their silk-lined tunnels. There is such a bank that skirts a fir wood near my house, the material being the loosest possible sandstone, scarcely hard enough in any place to resist a pinch between the fingers and thumb. About an inch or two beneath the soil this sandstone is quite excavated by the spiders; and as the sandy sides of their tunnels would fall in were they not supported in some manner, every tunnel accordingly is lined by a coating of tough webbing, very strong, very elastic, very porous, and yet not suffering one particle of sand to pass through its interstices. From the opening of each burrow a web is spread, looking very much like a casting net, with a hole through its middle. From this, again, radiate a number of separate threads, which extend to a considerable distance from the entrance. At the very bottom of its silken tunnel the living architect lies concealed, its sensitive feet resting on the web, so that it is enabled to perceive the approach of the smallest insect that crosses the spot which it has so elaborately fortified.—*Homes wihout Hands.*

COLOURING THE PLUMAGE OF BIRDS.—The Indians have a curious art by which they change the colours of the plumage of many birds. They pluck out a certain number of feathers, and in the various vacancies thus occasioned infuse the milky secretion made from the skin of a small frog. When the feathers grow again they are of a brilliant yellow or orange colour, without any mixture of green or blue, as in the natural state of the bird; and, it is said, the yellow feather will ever after be reproduced without a new infusion of the milky secretion.—*Fletcher and Kidder's Brazil.*

THE LION'S LIFE.—The career of a lion is not without its lesson. At two years he is equal to an ox; at eight years he is full grown—teeth, claws, and talons in perfection; at twenty his powers begin to fail—he dares not encounter the buffalo-bull, but shirks the contest, and prefers the kraal, where he can steal a kid or some heedless child or woman. He grows mangy and lean, and even the field-mouse is a victory. A cowardly hyæna or two, or some valiant sportsman finds him, and glories in his destruction.—*Land and Water*, Jan. 5.

COLOURS OF METEORS.—A word or two as to colours of meteors. These appear to differ, at least the observations differ. Thus (Humboldt's *Cosmos*, chapter on Shooting-stars), of 4,000 observations collected during nine years, two-thirds were white, one-seventh yellow, one-seventeenth yellowish-red, and one thirty-seventh green. Now, of 271 meteors observed at the Royal Observatory, Greenwich, on the night of November 12, 1865, 197 were blue, 34 white, 34 bluish white, the remaining 10 being, some yellow, some red, and some green.—*Chambers's Journal*, Dec. 22.

LADY BIRD.—We cannot conclude our article without a word of praise for the farmer's active little friend, the lady bird, whose true character requires vindication, since it is not unfrequently condemned by the ignorant as an enemy, and we well remember an otherwise intelligent farmer attributing the loss of his turnips "to them earriwigs and lady cows," one, if not both, of which were doing all they could to clear the crop of its real enemies. The lady bird is most voracious in her tastes, and both in the imago and larva state wages war upon lice, bugs, &c.—*Field.*

CURIOUS PEBBLE.—A pebble (pure silex) was recently picked up at Eastbourne by the son of a lapidary of Terminus-road. This stone, on being cut and polished, was found to contain the profile of a dog's head, as perfect, it is said, as if drawn by an artist. No less than 20 guineas had been refused for this great curiosity, which is now mounted as a brooch, and is valued at 50 guineas.—*Building News.*

NUMBER OF PLANTS ON THE GLOBE.—Let us establish, before going further, the approximate number of vegetable species which inhabit our globe. The appreciation of the statistics of plants is necessarily very varied in this sort of estimate. Linnæus, in 1753, was acquainted with 6,000 species. Persoon, in 1807, reckoned 26,000. In 1824 Stendel carried the number up to 50,000, and in 1844 to 95,000. The most recent works contain about 120,000 species. From the species described botanists have been able to form some approximate estimate of the total number of existing species. By an ingenious calculation of the space occupied by an average-sized plant, Alphonse de Candolle thinks he may infer that the number cannot be less than from 400,000 to 500,000.—*Louis Figuier's Vegetable World.*

BEAUTIFUL SPONGE.—The British Museum has lately received a series of specimens of the beautiful sponge called Venus's Flower Basket (Euplectella Speciosum). It is more like the work of the lacemaker than a congeries or republic of minute jelly-like animals; and the thread of which it is woven is so hard that it will scratch glass.—*Athenæum.*

Remarks, Queries, &c.

(*Under this head we shall be happy to insert original Remarks, Queries, &c.*)

THE MERLIN, or Blue Hawk, is said, as a rule, to build its nest on the ground. I think there is no foundation for this statement. Out of three nests taken not long since, not a single nest was built on the ground, one being in a hollow in a larch, the other two being up fir-trees. C. E. M.

LIFE AT THE BOTTOM OF THE ATLANTIC.—At the Natural History Society of Glasgow, a series of *foraminifera* was exhibited, obtained from mud brought up from the Atlantic sea bed, in the soundings made by Captain Anderson, of the Great Eastern, at a depth of 2,000 fathoms. The series embraced about fifteen different species. The *foraminifera*, are minute marine animals, with calcareous shells of a spiral form. They are very elegant in appearance.

WINTER ACONITE.—What colored flower has the Winter Aconite, and what does it grow best in? AMATEUR.

[Eranthis hyemalis, or winter aconite, is a small stemless, tuberous, herbaceous plant, inhabiting shady places in the midland parts of Europe. The flowers are cups of bright yellow; it has pelate, many cut pale green smooth leaves, and a single-flowered scope only a few inches high. Perhaps some of our readers can tell you what it grows best in.—ED.]

THE PIKE.—Although the most voracious, and one of the largest of our British fresh-water fish, is sometimes killed in a very peculiar way. A large pike was seen to snap at a frog, when the frog sprang upon the head of the fish and fixed its claws into its eyes, and in spite of the endeavours of the pike to rid himself of it, maintained its position until the fish died. The pike weighed 15 pounds, the frog three-quarters of an ounce. C. E. M.

COLIAS PALÆNO—May Colias Palæno be regarded as a British species, or is there any record of its being taken in England. It is figured by Wood in the "Index Entomologicus," pl. 53. fig. II. and introduced there amongst the list of doubtful British Butterflies.

F. WILKINSON.

The BOHEMIAN WAXWING.—Mr. Charles Norris, Buston Vicarage, writing to the *Standard*, Jan. 7, 1867, gives an account of his having shot one of these birds. He says: my bird measures nearly nine inches, has eight tips on one wing, seven on the other; four feathers in the tail are also slightly wax-tipped, and like all the specimens I have seen in Norfolk, numbering forty-five, has the tawny-brown feathers under the tail. More than a hundred have been shot in Norfolk this year. I believe they come over in largs flocks, and disperse in knots of ten to twenty.

THE TALLOW TREE.—Having lately heard that the tallow tree of China, which gives rise to a vast trade in the northern districts of the celestial empire, has been introduced into India, can any of your readers favour me with an account of this tree, or inform me where I can obtain a full description of it? I. S.

SWALLOW'S NEST.—The following may interest some of your readers:—There was an arch over the front door of our house, with ledges in the interior. A swallow thinking that this would be a convenient spot to build a nest commenced operations, using mud only. While so doing particles fell and stained the flag at the front door; upon which my brother thinking the bird a nuisance pulled it all down, when nearly completed. But the bird, not to be outdone, recommenced operations, building a second nest, which shared the same fate. The bird then flew away as if to consider what was best to be done after the ruin of her second house. She returned and began a third time, this time mixing hay and other litter with the mud to render it more adhesive. With these materials she constructed her nest, which for pity's sake was allowed to stand; and here she spent her summer and hatched her young. J. A. SLATER.

Rushton.

THE POTATO AND ITS PARASITES.—Under this head in the *Times* of Jan. 10th, is the following:—"It is stated in *La Patrie* that the microscope reveals to us the existence of a small black spot of the diameter of a pin's head, in the potato. In this small space can be detected some 200 ferocious animals of a coleopteric form, which bite and tear each other with continued fury. It is easy to comprehend the potato disease when such an intestine warfare is raging."

Quite as easy we should say as to comprehend this account of the intestinal condition of "the potato," presumably by the context of potatoes in general. The arena of the combat, it is true, is very limited, the diameter of a pin's head even of the largest size would afford no room for the combatants to have fair play, and we might expect that in such a general fight as would ensue among "ferocious creatures" in proximity there would be nothing left but fragments of the "coleopteric forms." But clearly these atomic monsters are not like the famed Kilkenny cats; they not only live to eat, but live in spite of being eaten, and accomplish the purpose of their being by causing the potato disease. Prodigious! Nature maximé miranda in minimis. We wish the observer with the microscope had conveyed more definitely what he means by "the coleopteric form." The *coleoptera* of ordinary entomologists have hardy horny coverings, and vary in form from globular to cylindrical or multiangular, and are often beset with long spines; what then is the coleopteric form? But is not the whole story one of the pseudo-scientific statements which are put forth from time to time to excite the wonder and talk of a credulous unobservant public? W. DOUGLAS.

Lee, 10th Jan., 1867.

TURTLE DOVE.—In an aviary at Knowlsley there is a turtle dove which hatched two young ones in a tree in the open ground on Christmas day morning. The same pair of doves hatched on Christmas day last year, in the same tree, and on New Year's day the year before.—*The Liverpool Albion.*

THE GOLDEN EAGLE.—A fine specimen of this bird, a female, was shot on Saturday, December 29th, close to the sea beach, at Kunkel Cave. The bird is in excellent plumage, and measures about eight feet from tip to tip of the extended wings: it is a very rare bird here, and is supposed to have come from Norway. It was exhibited at the town hall during the week.

J. M. (St. Andrew's.)

MINUTE ANIMALS.—It has been found that in certain Bohemian schists there are fifty-one millions of animalcules to the cubic inch; each skeleton weighing no more than the two hundred-millionth of a grain.

STATE OF THE WEATHER NEAR LONDON.

Dec. and Jan.	Moon's Age.	BAROMETER.		TEMPERATURE.					Wind	Rain.	REMARKS.
				Of the Air.			of the Earth				
		Max.	Min.	Max	Min	Mean	1 foot deep	2 feet deep			
Thurs. 13	6	29.521	29.335	56	35	45.5	45½	45½	S.W.	.20	Rain; cloudy; slight rain; fine at night.
Friday 14	7	29.470	29.377	50	28	39.0	46	45	W.	.00	Overcast; very fine; slight frost.
Satur. 15	☽	29.452	29.372	51	38	44·5	46	45	W.	.15	Fine; constant rain; showery at night.
Sunday 16	9	29.892	29.662	50	25	37.5	46½	45	S.W.	.00	Fine; overcast throughout; slight frost.
Mon. 17	10	30.186	30.142	52	42	47.0	45	44	S.W.	.01	Hazy; slight rain; very fine at night.
Tues. 18	11	30.219	30.123	53	40	46.5	46	45	S.W.	.00	Hazy clouds; densely clouded; very fine.
Wed. 19	12	30.284	30.215	56	20	38.0	48	43	N.W.	.00	Exceedingly fine, very mild for the period of the season; frost
Thurs. 20	13	30.436	30.367	39	29	34.0	45	45	W.	.01	Frosty and foggy; foggy throughout; slight frost.
Friday 21	●	30.288	30.279	40	26	33.0	45	45	W.	.00	Hazy; fine; foggy; very fine at night; slight frost.
Satur. 22	15	30.340	30.301	42	32	37.0	43	43	S.W.	.01	Foggy throughout the day.
Sunday 23	16	30.333	30.313	45	31	38.0	44	43	W.	.00	Hazy; overcast; fine at night.
Mon. 24	17	30.244	30.222	43	28	35.5	45	43	S.W.	.01	Hazy and very mild for the season; drizzling rain; slight frost
Tues. 25	18	30.192	30.073	43	34	38.5	45	43½	S.W.	.00	Very fine; overcast; very fine throughout.
Wed. 26	19	29.988	29.912	53	37	45.0	46	44	S.	.10	Densely overcast; remarkably fine; boisterous; rain at night
Thurs. 27	20	29.831	29.742	54	40	47.0	46	44	W.	.00	Boisterous; cloudy; starlight at night; but without frost.
Friday 28	☾	29.850	29.865	55	40	47.5	47	45	W.	.00	Overcast; fine; warm for the season.
Satur. 29	22	29.788	29.404	51	30	40.5	47	45½	S.W.	.04	Fine; very fine; boisterous, with rain at night.
Sunday 30	23	29.850	29.213	45	19	32.0	47	45	W.	.00	Flear, quite cloudless; very fine; frosty at night.
Mon. 31	24	29.270	29.247	35	19	27.0	44	44	S.W.	.00	Frosty; partially overcast; fine; frosty; barometer very low
Tues. 1	25	29.342	29.250	35	15	25.0	43	43½	N.E.	.00	Clear and frosty; exceedingly fine; severe frost.
Wed. 2	26	29.600	29.004	30	(-)4	13.0	43	43	N.E.	.00	Heavy snow storm; drifting snow; intense frost; thermometer at night 4 deg. below zero—(36 deg. below freezing.)
Thurs. 3	27	29.810	29.650	33	2	17.5	40	40	N.E.	.00	Hazy; densely overcast; snowing; overcast; severe frost.
Friday 4	28	29.960	29.888	30	11	9.5	40	40	S.W.	.00	Intense frost continuing throughout the day; 11 deg. below zero at night.
Satur. 5	29	29.974	29.902	30	16	23.0	40	40	N.E.	.54	Hazy; overcast; cold wind at night.
Sunday 6	○	29.378	29.336	49	30	39.5	39½	40	S.E.	.00	Hazy; with slight rain; fine and rather mild.
Mon. 7	1	29.230	29.026	53	44	48.5	35	40	S.W.	.46	Rain; cloudy, with mild temperature; very boisterous at night.
Tues. 8	2	29.114	28.760	52	36	44.0	35	40	S.W.	.01	Boisterous, with rain; very boisterous; fine at night.
Wed. 9	3	29.046	28.832	48	36	42.0	40	42	S.	.29	Boisterous, with rain; fine at night.
Thurs. 10	4	29.426	29.070	43	26	34.5	40	40	W.	.00	Very densely clouded; cloudy and damp; overcast.
Friday 11	5	29.680	29.584	38	16	27.0	40	42	N.E.	.00	Fine throughout; sharp frost at night.
Satur. 12	6	29.660	29.518	34	14	24.0	39	39	S.	.00	Dry and frosty; snow falling thickly in broad flakes; overcast.
Sunday 13	☽	29.700	29.460	35	3	19.0	39	40	N.	.00	Clear and frosty; very fine; frosty; within 3 degrees of zero at night.
Mon. 14	8	29.788	29.760	33	7	20.0	39	39	W.	.00	Severe frost; clear and frosty; as low as 7 deg. at night.
Tues. 15	9	29.844	29.708	36	20	28.0	38	38	N.E.	.00	Severe frost; uniformly overcast; cold frosty wind.
Wed. 16	10	29.840	29.640	38	25	31.5	39	39	N.E.	.00	Clear and frosty; slight snow; overcast. Notwithstanding the low temperature of the air, that of the earth, it will be observed, has been, and still continues, unusually high for the season, and has been parting with heat from a source of about 40 deg. for nearly a fortnight, to act constantly night and day on the under surface of the rapidly formed ice, which from this cause must have been rendered fatally weak.

GROWTH OF THE VINE.

The reciprocal action of Root and Branch is a fact so fully recognised by physiologists that to enter more than cursorily on its discussion would be a waste of words ; but as some may not fully understand what is meant by this reciprocal action, it may be necessary to give a little explanation. Taking an Oak, Elm, Ash, or any other kind of forest tree, it has been ascertained by experiment, and is now an admitted fact, that however far the branches of a fully exposed tree may extend laterally, however great the diameter or circumference of the branches may be, the superficial area covered by the roots, impediments apart, will be the same, if not more. The roots of some trees, as for example the Elm, Ash, Poplar, &c., will travel a considerable distance in search of nutriment ; indeed these might, as compared with the Oak, be called predatory plants, ever ready to plunder the soil which surrounds them. In recently making some alterations we found that the roots of an Elm and an Acacia, forming part of a neatly clipped hedge close by, had extended through some Asparagus beds more than 90 feet. But taking a plant in good soil, and fully exposed on all sides, the roots rarely extend beyond the circumference of, or area of, the branches, and if they do it will almost invariably be on the windward side, so as to act as a counter strain against the leverage of the branches when pressed by severe storms of wind. Such is the provision which Nature uncontrolled provides for plants left to her control ; but when her journeyman, the gardener, steps in, he too frequently thinks to improve upon Nature's teachings, and sometimes sets about it in a very singular manner.

Hence, in the management of the Vine, what do we do? We provide a border of considerable area and rich material, draining it thoroughly—sometimes paving, concreting, and even warming the bottom, and generally making the border from 18 inches to 3 feet deep, and occasionally more. Thus we provide a rich pabulum for the plants to feed upon, and what do we do next? Why, so soon as the plants get into free luxuriant growth we commence pinching and 'thumb-screwing' the young branches—the laterals, as we call them in Vine management—some cultivators in fact pinching them out altogether. Now, if the action of the root and branch is reciprocal, and there can be no doubt of it, this pinching or removal of the branches is a direct and constant check upon the progress of the roots, and hence while we invite growth at the root, we prevent it by the injudicious management of the branches. Of course under artificial treatment it would be wrong to retain more branches than could be exposed to the full action of light, and thus enabled to perform their proper functions ; but in the case of a young Vine trained for the first season on the single-rod system and growing vigorously, it is exceedingly questionable if, so long as the leading shoot was not checked, it would not be better to train the lateral shoots out 18 inches on each side than to follow the present denuding system. If there is any truth in physiology it is quite certain that by such a system more roots would be formed, and as the first object of the Vine planter should be to secure healthy and extended root action, this appears to be the only natural means of doing so.

Some years back we were consulted by a gentleman who had built Vineries extensively. His largest house was 190 feet long by 30 feet wide, with a span-roof of Hartley's plate glass. At right angles at each end, thus forming three sides of a square or parallelogram, were two other Vineries, each 100 feet by 30 feet, and hence, as the borders were all outside, there was 30 feet of space at each end of the longest house where no border could be formed, and where consequently no Vines had been planted. We were asked to suggest a remedy for this empty space, and we did so by carrying the two end Vines horizontally along the wall plate, taking up from each, at intervals of about 3 feet, shoots perpendicularly to the top of the house. At the same time the fellow Vines, then two years planted, and very nice rods, were cut back to about 8 feet, and each was allowed to carry six or eight bunches of Grapes. Now it would perhaps be expected by many, that the two Vines trained horizontally, and from each of which nine shoots or rods were trained across the house, would not make such wood as those which carried a few bunches of Grapes and had only one shoot to make. But such was not the case ; the nine rods from the single Vine were quite as good as the single rod from the Vines that had borne fruit—a result scarcely anticipated, and much more gratifying than had been expected. The kinds were Royal Muscadine and Black Hamburgh, and of each variety the growth was about equal.

The growth of these two Vines we regard as supplying two exceedingly strong facts. If a Vine of a certain age and strength will carry nine shoots, just as well as another Vine of the same age carries one shoot and a few bunches of Grapes—certainly not equivalent to the work of the other Vine, it only shows how accommodating plants are, and how much more work they would do, under artificial treatment, if they were only allowed to do it. We regret that after the time specified, the end of the season when the growth before alluded to was made, we had not an opportunity of seeing the progress the plants made, but we can scarcely imagine a growth so well begun could have had anything but a good ending.

The Vine, it should be observed, when allowed full freedom of action is not a profuse root producer; that is, in the open border it does not produce that multiplicity of roots so characteristic of it under pot or artificial treatment. Such being the fact, it is essential in planting a Vinery to make a narrow border at the commencement say 6 feet wide, and then, as soon as that space is filled with roots, to extend the border 4 or 6 feet wider. In this way it is fair to infer a much larger quantity of roots will be formed at home, that is near to the house, and once formed there, they are sure to spread and ramify through the border as it is provided for them.

That a properly planted and developed Vine will do much more work, and carry a very much heavier crop than hitherto has been considered right, is no longer a matter of speculation. The success of the Vine at Finchley is positive evidence of the fact; and Mr. Norman, in his testimony respecting the Muscat Vine at Bromley Common, supplies another very gratifying fact, viz., that *the berries of former days were much smaller than those of the present*, so that now a Vine, say 100 years old, not only continues in perfect health, but has been improved, the berries not being so small as in former days. What evidence do the Vines of modern planting supply? As a rule, splendid bunches and berries for the first five or seven years after planting, and then they sink gradually but certainly into comparative mediocrity. This is the history of all the Vines from which the splendid Grapes for the London exhibitions have been cut for the last 20 years. Vines in robust youth produce fine bunches for a few years under the restrictive system of development, but left to themselves comparatively, and allowed to send their roots and branches far and wide, they not only continue to produce fine branches and berries, but, according to Mr. Norman's experience, after 100 years the berries may be had larger than they were when the Vine was younger. These are facts which should make us pause; and if we look philosophically into the matter we shall perhaps find that we have for years been working in the wrong groove, and that to bring the Grape to the greatest perfection, we must allow the Vine more room to develop itself both by root and branch. If any proof of this be wanting, select two common trees of any kind, and as nearly alike as possible. Next spring as soon as they start into growth, stop the shoots of one weekly, just as the shoots of the Vines are stopped in our hothouses, and if, by the end of the season, it is not evident how effectually the growth of the plant operated upon has been dwarfed as compared with that left to Nature, we shall be much mistaken. All evidence is in favour of allowing Vines to take a much wider range of growth than has been customary for many years past, and by doing so, and inducing constitutional vigour, we not only reduce the chances of the plant suffering from a temporary check, but we also place it, in a great measure, beyond a check of any kind. With a large growth of branches there must be an equally large development of roots, and hence the plant, by the number and activity of its feeders, is placed beyond the power of seasonal changes or slight accidents.

Nor is this evidence confined to the sunny south or the range of the Grampian Hills. There are Vines quite as large and as fruitful as those which have lately been alluded to. It is therefore worth while for gardeners to consider how they will read this lesson of Nature's teaching, and utilise it for the improvement of their Grape crop. Practically, especially in early forcing, we have always looked upon a strong main stem as a reservoir or store of nutriment upon which the young branches could feed until the roots got into active growth, and without this store, especially in the case of cold borders, we should have more failures than we have had hitherto. What is the cause of the incipient bunches of Grapes going blind? Let the young gardener study what we have written, and if he cannot find the answer to this question, we will try to find it for him.—*Gardeners' Chronicle*, Feb. 9th.

HOUSE SPARROWS.

Of all our native birds not one is so well known or so universally distributed throughout the British Isles as the House Sparrow (*Passer domesticus*). Town and country, smiling fields and barren moorlands, wherever there is a human habitation, however humble, all are the same to him, for he is always at home. Everywhere he is the same fearless, independent bird; but the town sparrow is a much more pert little fellow than his brother of the country, and of the former class the London bird is the *beau-ideal*—he seems to have borrowed all the forwardness and impudence of the London *gamin*, and, as for fear or timidity, it has no place in his disposition. But it is with country sparrows that we have now to do; and though they are rather more unsophisticated than those inhabiting our towns, they are still a fearless tribe, and very amusing with their consequential and impudent airs.

But notwithstanding all that can be alleged against them, they are eminently serviceable to man, and certainly do not deserve the indiscriminate attacks which are made upon them. I believe the benefits they confer in the destruction of caterpillars and other insects injurious to our various crops outweigh tenfold their consumption of corn and other seeds, and I have found them most valuable assistants in my garden in clearing my gooseberry and currant trees of caterpillars; one pair of sparrows, during the season of feeding their young ones, will kill in a week 3,400 caterpillars. I am convinced that the sparrow suffers unjustly from the many accusations brought against him by those who have not closely watched him feeding from one year's end to the other, but have formed their judgment from seeing, perchance, a flock revelling on the corn where laid by the wind, or even on the gathered sheaves.

The nest of the sparrow is a loose, careless structure, and it is amazing to see in some cases the quantity of materials of which it is composed without any apparent necessity for such an accumulation. The mouth of a cast-iron pipe, about six inches in diameter, proceeding from a stove in a laundry attached to my father's house was, singularly enough, chosen every year, and sometimes twice in the season, as the site for a nest. The stove was only used every fortnight, and in this time the nest was built and some eggs always laid, but I never knew the parents bring up a brood, for the smoking of the stove always led to the obstruction being discovered and removed; and sometimes I have found the eggs quite baked with the heat.

The space underneath the tiles of my own house was generally occupied by a pair or two of sparrows, and hearing one day a very noisy commotion on the roofs, and seeing numerous birds flying to and fro in apparent trepidation, as if some calamity had befallen them, I was convinced something was the matter, and procuring a ladder I mounted to the spot, and at once discovered the reason for all the outcry. One of the owners of a nest underneath the tiles—the female—in passing through the small aperture leading to her domicile, and which at the lower end tapered quickly, had evidently slipped, and her neck had become so securely wedged between the tiles that escape was impossible. Her dying struggles attracted her neighbours, who with great good will had done their best to extricate her from her unfortunate position; their zeal, however, was greater than their discretion, for they had pulled and tugged so earnestly that, when I arrived on the scene, hardly a feather was left on the body, which of course was lifeless.

I remember another similar instance, and on the same roof too, where a young one in leaving the nest had got its leg entangled in a loop of a piece of worsted which was amongst the materials composing the nest. It vainly tried to free itself, and, as in the former instance, a great crowd assembled to assist their unfortunate companion; but their efforts did more harm than good, for, as it hung halfway down the tile, suspended by the thread, they had tried to release it by pulling it, and with the same result as in the other instance, for by the time I reached it it was half stripped of its feathers, and its little life was almost gone.

In both these cases I feel convinced that the efforts which were made by the companions of the luckless sparrows were prompted by a feeling of compassion and a real desire to alleviate their misfortunes; their anxious hurrying to and fro, and the distress expressed in their cries, clearly indicated this. I have seen similar feelings of alarm and sympathy shown by domestic poultry, when on one occasion a cock was flying to the top of a fence in my own yard, but missed his aim, and fluttering down, his head slipped between two of the palings; the hens hurried to help him, but of course unavailingly, and he would soon have been strangled if I had not gone to the rescue.

I have often been amused to see a sparrow take possession of the nest of a house martin (*Hirundo urbica*). The eaves of a house near my own were always selected by the martins year by year for their erection, and rarely has a season passed without one of the aggressions occurring, which I have watched from my windows with much interest.

It always appears to me that this forcible taking possession of their neighbour's house by the sparrows was never done with any intention of making it their own residence, but from sheer mischief, and a desire to tease and tantalise the poor martins. These invasions always took place when the nest was empty, either before any eggs had been laid, or after the young had gained sufficient strength to take wing. I have watched the sparrow sitting quietly on the tiles above the nest, as if he was the most innocent creature possible, intent only upon his own affairs, and had not the slightest thought of intruding upon his neighbour's; but the moment he became assured that the nest was unoccupied, he fluttered down, and popping in, turned himself quickly round, and sat with his head peeping out of the opening. Great, of course, was the consternation and distress of the martins on discovering the intruder; but though I have seen the incident dozens of times, I never saw any attempt to attack or eject the sparrow, nor, as it is asserted has been done, to stop up the hole with clay, and thus to inclose him, as the erring nuns were of old,

Alive, within the tomb.

I have always been inclined to disbelieve this story altogether, for I thought that the sparrow was too bold a bird to sit quietly and allow itself to be thus immured, when a few strokes of its strong beak would speedily demolish its prison walls, but M'Gillivray adduces three such well-authenticated instances of such an occurrence that I am compelled to abandon my doubts in the face of such an authority. One of these instances he thus relates:—

"A few years ago, in the window of a second storey of a house in Linlithgow, inhabited by Mr. James Brown, buckle-maker, a pair of martins built a nest, which was taken possession of by a female sparrow. In attempting to dislodge this bold intruder, a dozen of their companions came to their assistance, but after many severe struggles they were unable to effect their object. For her rash conduct, however, they were determined to make her suffer. They agreed to entomb her alive by closing up the entrance with the mortar which they use in building their nests, and in this they succeeded. Mr. James Douglas, slater, with whom I have been a long time acquainted, and upon whose veracity I can depend, assured me that he was a spectator of the occurrence, and that he in the presence of several individuals, some of whom he named, took the dead bird out of the nest. The truth of it is further confirmed by Mr. John Ray, nailer, in Linlithgow, who told me he was also present when it happened."

He also mentions two other instances that came within his knowledge.

What I have said about its boldness is well proved by the following incident, which occurred at the vicarage of Beeston, near Nottingham, in August, 1859. Numerous flocks of sparrows had frequented the grounds, and the cat belonging to the house had been watching their arrival, and seized every opportunity of pouncing upon them. She was at the foot of a tree one day, looking up at the sparrows, and doubtless on murderous deeds intent, which they seemed to divine, for in a few minutes they descended *en masse.* As the birds came within reach the cat made a spring at them; but the tables were now turned, for so fierce and pertinacious was their attack, so closely did they follow up their enemy, hemming her in on all sides, that she was perfectly cowed, and compelled to seek safety by springing through a window, leaving the victory to her brave little assailants.

I know a few years since an instance of the power of imitation which the sparrow possesses. A young one was brought up by a person at Newark from the nest, its place being always in a cage by the side of a skylark. Here it learnt the song of the lark, and would repeat it so accurately, that if you did not see the bird it was impossible for a time to tell whether it was the lark or the sparrow that was singing. Often have I heard and admired its surprising imitation, when suddenly it would cease its song and utter the usual harsh chirrup of its race. Sometimes its sweet song would be frequently interrupted by this natural note, while at others it would sing for a long time without giving vent to it.

Variations of the sparrow's plumage are not uncommon, being chiefly interminglings of white. In December, 1859, one was shot at Ollerton which had the whole of the plumage white, the head and back merely having a slight tinge of brown, giving the white on those parts a dirty appearance.

I have seen a singular place selected for the nest of a sparrow—viz., the ornamental iron brackets supporting the roof over the platforms of several of the stations on the Liverpool and Manchester Railway, and where they seemed quite unconcerned by the passage of the trains. —*Field*, Jan. 26th.

TREE-FERNS.

TREE-FERNS form one of the most striking and conspicuous, and at the same time elegant, features in the landscape of certain tropical regions. They would seem to unite in themselves the majestic growth of palms, with all the delicacy of the lower ferns, and thus attain a beauty to which nature shows nothing similar.

They are confined to districts within the torrid zone, at least in the northern hemisphere; though in the southern they are found in as high a latitude as the farther extremity of Van Dieman's Land, and at Dusky Bay, New Zealand—*i.e.*, nearly the forty-sixth parallel. This difference is due in all probability to the greater amount of moisture in the atmosphere in the southern hemisphere; inasmuch as a moist and damp climate is such as is especially favourable to their development. Indeed, wherever the tree-ferns appear within the tropics, from the plain to the height of 3000 or 4000 feet, the soil and atmosphere are full of moisture; whereas, on a barren soil, or where the atmosphere is very dry, they are entirely wanting. On tropical mountains of South America, they are found at an elevation varying between 1900 and 3800 feet, the palms and bananas taking their place at a lower elevation. As might be inferred, islands would be expected to abound with these noble creations; and such is the case. The coasts of the Sandwich, Cape de Verd, and Ladrone Islands, as well as New Caledonia, the Isle of France, the

Isle of Bourbon, and the most southern of the Friendly Islands in the southern hemisphere, possess, particularly in summer, almost the same climate as is found at the equator, and consequently the same vegetation prevails there as in equatorial regions, only somewhat less luxuriant, since there is generally a deficiency of soil and water. But, in these islands, the palms and bananas quickly disappear when we ascend above the level of the sea; and at the height of 300 or 400 feet, we enter the region where the shrubby and arborescent ferns predominate.

In the Brazils, Von Martius observed trees of the handsome *Alsophila excelsa*, and of *Didymochlæna*, upwards of twenty-five feet in height, and six or eight inches in diameter.

In the eastern hemisphere, Dr. Hooker met the species *Alsophila gigantea* ascending nearly 7000 feet in elevation on the outer (Sikkhim) Himalaya. The black trunks of these ferns are rugged in comparison with those of other species of many other countries, and seldom reach the height of forty feet. Another species, *A. spinulosa*, of which the soft pith is eaten by the native Lepchas in times of scarcity, is very abundant in East Bengal and the peninsula of India; while the last-mentioned *A. gigantea* is far more common from the level of the plains to 6500 feet elevation, and is found as far south as Java.

The most luxuriant specimens visited by Dr. Hooker were at Silhet, where "in the narrow parts of the valleys, the tree-ferns are numerous on the slopes, rearing their slender brown trunks forty feet high, with feathery crowns of foliage, through which the sunbeams trembled on the broad and shining foliage of the tropical herbage below." Similarly, on some of the East Indian Islands, the tree-ferns grow in such numbers that their stems are as close to each other as the slender firs and pines of our plantations.

Beyond the extreme elegance of form, and the beauty of their foliage, tree-ferns possess little or no economic value. The remarkable nature of their wood renders them totally unfit for any purposes to which our ordinary timber trees can be applied.

The mass of it consists of soft pith of a brown colour, through which are scattered, about the centre, isolated bundles of hard woody fibres, while near the circumference curiously curled or waved plates of wood occur. These touch one another at different places up the stem, and unite at those points. They separate again, to reunite at some higher place up the stem. From these points, where the woody plates unite, bundles of wood pass off externally into the leaves (fronds), and go to form the "ribs" and "veins" which constitute their "skeleton" or framework.

A remarkable difference exists between these plates of wood and that of our own forest trees. In the latter a cross section exhibits a series of concentric circles; these really being transverse sections of cylinders of wood, continuous throughout the tree, and of which the outermost layer is the youngest, one cylinder being formed annually outside that of the preceding year. Moreover, the whole is encased in a separable bark which continues to increase in thickness by yearly additions to its inner surface. But in tree-ferns there is nothing of the sort. The plates of wood, once formed, never increase in size laterally. They grow only at the summit, and thus become elongated as the tree itself increases in height. Again, there is no true bark, as, *e.g.*, in the oak. There is a sort of rind, principally formed by the bases of the leaves, which, as they fall, have diamond or lozenge shaped scars arranged more or less in a spiral manner upon the exterior surface of the stem. The lower part frequently throws out an innumerable quantity of fibre-like roots, giving it somewhat the appearance of an old branch of ivy, and which completely invest the trunk, forming a covering several inches thick; this covering, in fact, being often nearly, if not quite, as thick as the whole diameter of the trunk itself.

Another point of interest is the method of propagation, which is similar to that of any of our ordinary English ferns. If, for instance, a full-grown frond of the common "male shield fern" (*Aspidium Filix mas.*) be examined, there will be found on the under surface what appear at first sight as minute brown patches, or spots, each being covered by a little disk-like scale. These patches are called *sori*, and constitute the reproductive organs of ferns. The sori of *Alsophila nigra* consist of a number of little "sporanges," supported by short stalks, and growing from a small cellular cushion from which spring a quantity of delicate-jointed hairs. These "sporanges" have strong elastic borders, which, on their becoming mature, contract and cause them to burst; when out fall a number of seed-like bodies of a somewhat rounded or angular form, called spores. These, like seeds, fall to the ground, germinate, and give rise to young fern-plants. They are not true seeds, because these latter can only be produced by the agency of flowers, or at least certain elements of them, which are essential to their production; and it must be borne in mind that ferns never blossom. Our "royal fern" (*Osmunda regalis*) is sometimes called the "flowering fern," but it is a misnomer, the fact being that, when about to produce its fructiferous organs, it sends up a tall frond of different construction from the rest, and entirely covered with sporanges, few or no green parts accompanying them. Hence it presents some general appearance to a stem crowded with minute blossoms, but its construction is essentially the same as that above described.

A vast diversity obtains amongst the fronds of different ferns, as well as considerable variety in the form of the indusia, or scales over the sori, as well as in other points. Upon these distinctions the different groups of ferns are made, and receive different names accordingly. Nevertheless, there is a remarkable uniformity in all essential particulars throughout the class. One more particular is, perhaps, worth noticing; namely, that these gigantic tree-ferns come very near in point of structure of their organs of fructification to a minute but rare English fern (*Woodsia ilvensis*), in possessing peculiar hairs or bristle-like processes which rise from beneath the sori.—Rev. G. Henslow in *Leisure Hour*, Feb. 16th.

MUSHROOM HIVED ANTS.

LET us begin with the species that builds the mushroom-shaped edifice. These singular hives, shaped like gigantic mushrooms, are scattered by tens of thousands over the Otando Prairie. The top is from twelve to eighteen inches in diameter, and the column about five inches, the total height is from ten inches to fifteen inches. After the grass has been burnt they present a most extraordinary appearance; near Máyolo they are met with almost at every step. They are not all uniformly built, as they appear at a distance, but differ in the roundness or sharpness of their summits. I opened a great number of these, and followed up my researches, day after day, into the habits of their inhabitants. These, and all similar edifices, are built to protect the White Ants against the inclemencies of the weather and against their enemies, which are very numerous, and include many predacious kinds of fellow ants.

The mushroom shaped hive is not so firmly built in the ground but that it can be knocked down by a well planted kick. It is built of a kind of mortar after being digested in the stomachs of the ants. When felled, the base of the pillar is found to have rested on the ground, leaving a circular hollow, in the middle of which is a ball of earth full of cells, which enters the centre of the base of the pillar, and the cells are eagerly defended by a multitude of the soldier class of ants, which I took to be males, all striving to bite the intruder with their pincer-like jaws. On breaking open the ball, which, when handled divided itself into three parts, I always found it full of young white ants, in different stages of growth, and also of eggs. The young were of a milky white colour, while the adults were yellowish with a tinge of grey when the abdomen is full of earth. Besides these young ants, there were a great many full grown individuals, whom I took to be females, and who appeared to be the workers or labourers described by entomologists. These have not elongated nippers, like the soldiers, but have very bulky abdomens, and they are inoffensive. Besides these soldiers and workers, I always saw, whenever I broke a hive, a very much larger specimen than the other two, which came in from the inner galleries, looked round and went away again. These large ants were very few in number. There were therefore three distinct sets of individuals. To these large ones I shall give the name of head men, or chiefs.

In order to examine the rest of the structure, I often took an axe, and broke the rest into several pieces; but the material was so hard, that it required several blows before I succeeded. I tried then to make out the structure of the chambers and galleries of which the interior was composed. But before I could do this, I was somewhat perplexed at discovering that there was another distinct species of white ant, mixed up with the proper architects of the edifice. The soldiers of this other species, were much smaller and more slender, and as I brake the pieces, these two kinds fell too fighting one another. On close inspection, I found that these slender fellows come out of cells composed of yellow earth, whilst the others inhabited cells of black earth. The yellow colour was due to a coating of some foreign substance on the walls of the cell. The chambers inhabited by the slender species did not communicate with those peopled by the lords of the manor, they seemed rather to be inserted into the vacant spaces, or partition walls, between the other cells. No doubt they had intruded themselves after the building had been finished, from under the ground. In the fight the larger kind showed no mercy to the smaller. It was quite marvellous to witness the fury with which the soldiers of the one kind seized the bodies of the others with their powerful pincer jaws, and carried them away into their own chambers. The soldiers of the slender kind also possessed long pincer like jaws, and I noticed in one instance, when a worker of the larger kind had seized a small worker who was in her last struggle for life, that one of these slender soldiers flew to the rescue and snapping into the soft abdomen of the assailant twice its size, let out its contents. The slender one then fell from the pincers that had gripped her, but life was extinct. The rescuer came, examined the body, and seeing that she was dead went away and disappeared. If she had been only wounded, she would probably have been carried away as they do the young. I may here remark that with the exception of the head, the body of the termites is exceedingly soft. On examining the structure of the soldiers it is evident that their powerful pincer jaws are made for wounding and piercing, while the structure of the workers shows that their pincers are made for the purposes of labour. Nothing astonished me more than this impetuous attack; my attention was intense on this deadly combat. The weaker species knew the vulnerable point of his formidable enemy who was too busy to protect himself. A further examination showed me that the mushroom-like cap of the whole edifice was composed of both black and yellow cells. This curious mixture of two species, each building its own cells and yet contributing to form an entire and symmetrical edifice, filled me with astonishment. The wonder did not cease here; for in some of the mushroom-like heads there was still a third kind quite distinct from the other two, not a white ant.

The mushroom nests are built very rapidly, but when finished they last in all probability many years. The ants work at them only at night, and shut out all the apertures from the external air when daylight comes, for the white ant abhors daylight, and when they migrate from an old building to commence the erection of a new one, they come from under the ground. Sometimes they add to their structures by building one mushroom head above another. I have seen as many as four, one on the top of the other. The new structures are built when the colony increases; new cells must be found for new comers. The shelter is quite rain proof.

I passed hours in watching the tiny builders at work. Their daily labours in the cells, which I was enabled to do by laying open some of their cells, and then observing what went on after all was quiet. So soon as the cells are broken a few head men or chiefs are seen, each one moves his head all round the aperture and then disappears into the dark galleries, apparently without leaving anything. Then the soldiers come; these do no work, but there must be some intention in their movements, they no doubt were on guard to protect the workers: I was never able even with my magnifying glass to see them do anything. The workers then come forward, and each of them turns round and eject from behind a quantity of liquid mud into the aperture, and finally walls it up. They come one after the other and all of them leaves their contributions. This is done first in a row, from one end of the aperture to another, then each ejection is put on the top of the other, with a precision that would do honor to a bricklayer or stonemason. The question to me was to know if the ants went away to eat more earth and came again. How much would I have given to be able to see into the dark recesses of the chambers, but I do not see how this will ever be done. The apertures of the cells were only closed during the day, and during the following night the part of the structure which I had demolished was rebuilt in its original shape. Some of them brought very small grains of sand, or minute pebbles, and deposited them in the mud. When demolishing their shelter, I saw several cells filled with these little pebbles which I had also collected and preserved. Soon after others came and closed up the cell. The earth which they eat, can be seen shining through the thin skins of their bodies, but I was unable to see where it was stored in the interior of the edifice. The mud is mixed with gluey matter through the digestion when it is ejected, and with this material the little creatures are enabled to build up the thin tough walls which form their cells, and in course of time the firm and solid structure of the entire nest. Sun and rain are equally fatal to the white ants; thus it is necessary that they should build a hive impervious to light, heat, and rain. I have put white ants in the sun, and they were shortly afterwards killed by its heat. I thought each cell was perhaps inhabited only by one ant, but the great number I saw in each mushroom-like edifice, made it quite improbable that it should be so.—*Du Chaillu's Journey to Ashango Land.*

WHAT ARE GLACIERS?

Rendu first observes the piling-up of the mountain snows. The snow falling upon the mountains is partly converted into water, which runs away to the river and through the river to the sea. The ice thus formed Rendu estimates to equal in the Alps fifty-eight inches annually, which would make Mont Blanc four hundred feet higher in a century, and four thousand feet higher in a thousand years.

"Now it is evident," observes he, "that nothing like this can occur in nature. This ice must be removed by the operation of some natural cause;" and observations having shown that this actually takes place, Rendu occupies himself with methods to discover how Nature has performed the task; and he comes to this very rational conclusion—that the glacier and river are in effect the same, that between them there is a resemblance so complete that it is impossible to find in the latter a circumstance which does not exist in the former, and as the river drains the *waters* which fall upon the hillsides to the ocean, so the glacier drains the *ice* which forms from the snows on the mountain-sides down to the same level.

And he closes his argument with declaring the law—"The conserving will of the Creator has employed for the permanence of His work the great law of *circulation*, which strictly examined is found to reproduce itself in all parts of Nature."

And in illustration of this law we see that the waters circulate from the ocean to the air by evaporation, from the air again to the earth in the form of dews, rain, and snows, and from the earth back again to the ocean through the great rivers which have gathered up the little streams from every hillside and valley.

Now this law of circulation is in the icy regions of the Alps, of the lofty Himalayes, of the Andes, of the mountains of Norway and of Greenland, the same as in the lower and warmer regions of the earth where the rivers drain the surface-water to the sea.

A glacier is in effect but a flowing stream of frozen water, and the *river systems* of the temperate and equatorial zones become the *glacier systems* of the arctic and antarctic.

We have now seen that a part of the snow which falls upon the mountains is converted into ice, and this ice, strange though it seems, is moveable: by what exact principle of movement has not yet been decided to the satisfaction of the learned, but it is nevertheless true. Rendu truly remarks—"There is a multitude of facts which would seem to necessitate the belief that the substance of glaciers enjoys a kind of ductility which permits it to mould itself to the locality which it occupies, to grow thin, to swell, to narrow itself like a soft paste."

And this, true of the Alpine passes, is true also of the Greenland valleys. A great frozen flood is pouring down the east and west slopes of the Greenland continent; and, as in the Alps, what is gained in height by one year's freezing is lost by the downward flow of the mobile mass.

And this movement is not embarrassed by any obstacle. The lower chains of hills do not arrest it, for it moulds itself to their form, sweeps through every opening between them or overtops them. Valleys do not interfere with its onward march, for the frozen stream enters them and levels them with the highest hills. It heeds not the precipice, for it leaps over it into the plain below—a giant frozen waterfall. Winter and summer are to it alike the same. It moves ever forward in its irresistible career, a vast frozen tide swelling to the ocean. It pours through every outlet of the coast, ranges down every ravine and valley, overriding every impediment, grinding and crushing over the rocks, and at length it comes upon the sea. But here it does not stop: pushing back the water, it makes its own coast-line, and moving still onward, accommodating itself to every inequality of the bed of the sea as it had before done to the surface of the land, filling up the wide bay or fiord, expanding where it expands, narrowing where it narrows, swallowing up the islands in its slow and steady course, it finally reaches many miles beyond the original shore-line.

And now it has attained the climax of its progress.

When long years ago after pouring over the sloping land it finally reached the coast, and looked down the bay which it was ultimately to fill up, its face was many hundreds of feet high. Gradually it sank below the line of waters as it moved outward, and finally its front has almost wholly disappeared.

In a former chapter I have mentioned that a block of fresh-water ice floating in sea water rises above the surface to the extent of one-eighth of its weight and bulk, while seven-eighths of it are below the surface. The cause of this is too well known to need more than a passing explanation. Every schoolboy is aware that water in the act of freezing expands, and that in the crystal condition fresh water occupies about one-tenth more space than when in a fluid state, and hence when ice floats in the fresh water from which it was formed one-tenth of it is exposed above, while the remaining nine-tenths are beneath the surface. When this same fresh-water ice (which it will be remembered is the composition of the glacier) is thrown into the sea, the proportion of that above to that below being changed from *one* and *nine* to *one* and *seven* is due to the greater density of the sea water, caused by the salt which it holds in solution.

Now it will be obvious that as the glacier continues to press further and further into the sea, the natural equilibrium of the ice must ultimately become disturbed; that is, the end of the glacier is forced further down into the water than it would be were it free from restraint, and at liberty to float according to the properties acquired by congelation. The moment that more than seven-eighths of its front are below the water-line, the glacier will like an apple pressed down by the hand in a pail of water have a tendency to rise, until it assumes its natural equilibrium. Now it will be remembered that the glacier is a long stream of ice many miles in extent, and, although the end may have this tendency to rise, yet it is for a time held down firmly by the continuity of the whole mass. At length, however, as the end of the glacier buries itself more and more in the water the tendency to rise becomes stronger and stronger, and finally the force thus generated is sufficient to break off a fragment, which once free is buoyed up to the level that is natural to it. This fragment may be a solid cube half a mile through, or even of much greater dimensions. The disruption is attended with a great disturbance of the waters, and with violent sounds which may be heard for many miles; but, floating now free in the water, the oscillations which the sudden change imparted to it gradually subside, and after acquiring its natural equilibrium the crystal mass drifts slowly out to sea with the current, and is called an ICEBERG. —Dr. I. I. Hayes' *The Open Polar Sea.*

INTELLIGENCE OF ELEPHANTS.

It is most interesting to observe the elephant, as it is to observe any other animal, not when it is practising tricks taught it by man, or acting under the influence of habits acquired in confinement, but when it is acting from its own impulse, and using its own natural sagacity. A person who has never seen an elephant except in a cage, kept quiet under the control of its keeper, can have but a faint notion even of its corporeal powers. For my own part I had no conception of the effect with which an elephant can use his trunk till, several years ago, in the Regent's Park Zoological Gardens, I saw one, that had been led out for exercise and left standing by its keeper for a few moments under a tree, whisk its proboscis perpendicularly up among the branches, twist off a leafy bough, with the utmost ease, in a moment, convey it to his mouth. Nor do we form any due estimation of the elephant's ingenuity and intelligence until we see him exercising it of his own accord.

"It is a usual part of the performances of an elephant at a public exhibition to pick up a piece of coin, thrown within his reach for that purpose, with the finger-like appendage at the extremity of the trunk. On one occasion a sixpence was thrown down which happened to roll a little out of the reach of the animal, not far from the wall; being desired to pick it up, he stretched out his proboscis several times to take it, but it was even yet a little beyond his reach; he then stood motionless for a few seconds, *evidently considering* (we have no hesitation in saying *evidently considering*) *how to act;* he then stretched his proboscis in a straight line as far as he could, a little distance above the coin, and blew with great force against the wall; the angle produced by the opposition of the wall made the current of air act under the coin, as he evidently intended and anticipated it would; and it was curious to observe the sixpence travelling by these means towards the animal till it came within his reach, and he picked it up. This complicated calculation of natural means at his disposal was an intellectual effort beyond what a vast number of human beings would ever have thought of, and would be considered a lucky thought and a clever expedient, under similar circumstances, in any man whatsoever. It was an action perfectly *intelligent,* and one that had no relation either to self-preservation or propagation."

"I was one day," says Mr. Jesse, "feeding the poor elephant (who was so barbarously put to death at Exeter Change) with potatoes, which he took out of my hand; one of them, a round one, fell on the floor, just out of reach of his proboscis. He leaned against the wooden bars, put out his trunk, and could just touch the potato, but could not pick it up. After several ineffectual efforts he at length *blew* the potato against the opposite wall with sufficient force to make it rebound, and he then without difficulty secured it. Now it is quite clear, I think, that instinct never taught the elephant to procure his food in this manner, and it must, therefore, have been reason or some intellectual faculty which enabled him to be so good a judge of cause and effect; indeed, the reflecting powers of some animals is quite extraordinary."

The male elephant called Jack, which was in the Zoological Society's Gardens in the year 1840, used to be made to fast the whole of Sunday, like the carnivorous animals, with the exception of a slight breakfast. But after enduring this weekly privation for a time he came to a resolution to submit to it no longer. Accordingly he made such disturbances on several successive Sunday nights that the keepers had little repose. But as this procured no relief to his hunger he at length proceeded further, and made on one occasion such a determined attack on his door that the people were glad to get up in the night to feed him. After this energetic demonstration he was allowed his full meals on Sundays, and continued quiet.

This elephant gave a remarkable proof of ingenuity by certain operations on the ceiling in front of his apartment. It was a ceiling formed of boards, and considerably lower than that of the room within, but thought to be sufficiently high to prevent him from injuring it, and its surface was made perfectly smooth, so as to afford him no means of effecting a hold on it. But, wanting something to do in the monotony of his confinement, he appears to have sounded it and concluded it was hollow; then, raising his head suddenly, he drove one of his tusks through a board, and next, setting to work with his trunk, he broke away the edges of the hole thus made and gradually enlarged it; putting his trunk through and tearing down board after board, until his proceedings were observed and means taken to stop them.

Of the elephant's sense and judgment, the following is given as a well-known fact in a letter of Dr. Daniel Wilson, Bishop of Calcutta, to his son in England, printed in the life of the Bishop, published a few years ago.:—An elephant belonging to an engineer officer in his diocese had a disease in his eyes, and had for three days been completely blind. His owner asked Dr. Webb, a physician intimate with the Bishop, if he could do anything for the relief of the animal. Dr. Webb replied that he was willing to try, on one of the eyes, the effect of nitrate of silver, which was a remedy commonly used for similar diseases of the human eye. The animal was accordingly made to lie down, and when the nitrate of silver was applied uttered a terrific scream at the acute pain which it occasioned. But the effect of the application was wonderful, for the eye was in a great degree restored, and the elephant could partially see. The doctor was in consequence ready to operate similarly on the other eye on the following day; and the animal, when he was brought out and heard the doctor's voice, lay down of himself, placed his head quietly on one side, curled up his trunk, drew in his breath like a human being about to endure a painful operation, gave a sign of relief when it was over, and then, by motions of his trunk and other gestures, gave evident signs of wishing to express his gratitude. Here we plainly see in the elephant memory, understanding, and reasoning from one thing to another. The animal remembered the benefit that he had felt from the application to one eye, and when he was brought to the same place on the following day and heard the operator's voice, he concluded that a like service was to be done to his other eye.

The two following stories are of a similar character. The second especially shows the sagacity of the animal :—

"During one of the wars in India, many Frenchmen had an opportunity of observing one of the elephants that had received a flesh-wound from a cannon-ball. After having been twice or thrice conducted to the hospital, where he extended himself to be dressed, he afterwards used to go alone. The surgeon did whatever he thought necessary, applying sometimes even fire to the wound; and though the pain made the animal often utter the most plaintive groan, he never expressed any other token than that of gratitude to this person, who by momentary torments endeavoured, and in the end effected, his cure."

"In the last war in India, a young elephant received a violent wound in his head, the pain of which rendered it so frantic and ungovernable that it was found impossible to persuade the animal to have the part dressed. Whenever anyone approached it ran off with fury, and would suffer no person to come within several yards of it. The man who had the care of it at length hit upon a contrivance for securing it. By a few words and signs he gave the mother of the animal sufficient intelligence of what was wanted; the sensible creature immediately seized her young one with her trunk, and held it firmly down, though groaning with agony, while the surgeon completely dressed the wound, and she continued to perform this service every day till the animal was perfectly recovered."—*The Reasoning powers of Animals*, by the Rev. J. S. Watson. Reeve and Co.

GEOLOGY OF AMERICA.

If we draw a line from New York to the east end of Lake Ontario, the Peninsular lying north-east between the St. Lawrence and the sea, consists of primitive interspersed with some patches of secondary rocks. From this line southward the country has a different geological character. A belt of alluvial soil, beginning at Long Island, extends along the shore of all the Southern States to Natchez, on the Mississippi, having an average breadth of a hundred miles, and probably including all Florida, except some high ground in the interior. It is everywhere penetrated by the tide-water in the rivers. On the west side of this is a region of primitive rocks from 100 to 200 miles broad, in which gneiss predominates. It embraces the eastern ridges of the Alleghanies with the rolling country at their foot. On the west side of this again is a long narrow zone of transition-rocks, including the western ridges of the Alleghanies, and extending from Lake Champlain to the north-west angle of Georgia.

One of the most remarkable circumstances connected with the primitive rocks is the granite ridge which forms the boundary between the primitive and the alluvial regions. This ridge seems to have been the ancient line of the sea-coast in the Southern and Middle States, and very probably through Connecticut.

New England rests on a bed of granite and marble, the Middle States on sandstone and freestone, and the greater part of the Ohio region has a foundation of limestone.

The oldest-known strata in the crusts of the earth, the Laurentian series, consisting of gneiss more or less of granitic, quartz rock, limestones, dolomites, conglomerates, and in the upper portion of feldspathic rocks, occur in the Adirondac region of Northern New York. The Green Mountains, the White Mountains, and a greater portion of the New England States, consist of crystalline formations of a more recent date, marked by the absence of argillaceous, talcose, and chloritic schists, and by various other characteristics.

The next overlying series, known as the Huronian, and regarded by Murchison as the equivalent of the Cambrian sandstones, is formed in Michigan and the southern shores of Lake Superior. Though these rocks have been classed as azoic, indications are found of their having been originally sedimentary deposits, abounding in organic bodies, the forms of which have been dislodged by the metamorphic action to which they have been subjected.

In Massachusetts, the central portion of North Carolina, and in Georgia, occur the oldest fossiliferous rocks, known as the "Taconic system," and characterised by ancient genera of trilobites. Some geologists maintain that some of the sandstones in Iowa and Minnesota should, by reason of their fossils, be placed in this system.

The crystalline and schistose strata of New England, the highlands of New York and New Jersey, and extending through the Appalachian chain to Alabama, have been variously classed, some considering that as they consist of feldspathic gneiss, quartz rocks, talcose, and chloritic slates, they form the base of the Appalachian system. Others consider them as the metamorphosed sandstones, etc., of the lower Silurian series.

From this range westward, the whole country to the rocky mountains, with the exception of the Ozark mountain region, in South Missouri, and a few localities in Wisconsin and the northern peninsula of Michigan, contain no crystalline rocks.

The lower silurian limestones come up to the surface at Cincinnati, Ohio, at Frankfort (Kentucky), and at Nashville (Tennessee). The carboniferous series whenever met with is the uppermost formation, except in Illinois, Iowa, and Kansas, where the Permian strata have been recognised. The great plains that extend from the Missouri and up the valleys of the Akansas, Red River, to the Rocky Mountains, are almost exclusively occupied by cretaceous rocks, sometimes overlaid with those of the tertiary age. Florida, Louisiana, and the coasts from Texas to Martha's Vineyard, are composed of the tertiary, the older strata cropping out inland.

The cretaceous formation rests principally on the metaphoric belt of the Appalachian, rising to the higher platform of those rocks, the ascent south of New York being marked by the first or lowest falls of the rivers, and determining the head of their navigation. This formation passes across New Jersey and the Northern Delaware, from New York Bay to the head of Chesapeake Bay, occurs at a few points in Virginia, near Wilmington, North Carolina, and through Central South Carolina and Georgia; thence it stretches in a broad continuous belt through Central Alabama, Northern Mississippi, and Western Tennessee.

A narrow belt of red sandstone occurs along the valley of the Connecticut, continued through New Jersey, across Pennsylvania, into Virginia.

The newer phiocene is met with in only a few localities in the southern part of Maine, and on the borders of Lake Champlain.

The drift formation covers all the northern part of the United States, the limit southward being lat. 40. The deposits of alluvium are mostly confined to the borders of the rivers and lakes, the most extensive and remarkable alluvial tract being that around of the mouth of the Mississippi, where it spreads out into a delta of broad area.

In the Rocky Mountains the metamorphic rocks of the Appalachian are repeated on a grander scale. Between the numerous ridges are wide belts of the cretaceous strata and modern tertiary deposits. These form the plains and slopes which stretch out towards the Pacific. In the mountainous districts are found all the formations from the lower crystalline groups to the coal, often traversed by great dikes of trappean and other eruptive rocks.

Beyond the Sierra Nevada and Cascade Mountains, and on the Colordo River, is a volcanic district, extending to the Pacific. It consists chiefly of tertiary strata, which have been so broken up by movements of the crust and volcanic eruptions, as to present an excessively rugged and diversified structure.

The metals of the United States are principally found in the crystalline rocks, the exceptions being the copper regions of Lake Superior, and some of the western lead and iron mines, frequently in sandstone.

In the Atlantic division the metals follow the Appalachian range. In the Pacific division they follow the Rocky Mountain and Sierra Navada ranges, the *débris* from which, swept down into the tertiary strata, have furnished these with the precious metals in large deposits.

Except a few insulated fields, all the bitumous coal in the United States lies west of the Appalachian chain, where a vast series of coal-beds stretch from the mountains westwards through Ohio, Indiana, and Illinois, parts of Kentucky, Tennessee, and Alabama, into the State of Mississippi, and even as far as 200 miles beyond the Mississippi River. Anthracite coal, or that best suited for manufactures, lies at the northern extremity of this great field, in Pennsylvania, in the western parts of Virginia, in part of Ohio, and in Illinois. In the central portion of the lower peninsula of Michigan is a coal-field of some extent, and another and larger one spreads over nearly the whole of Iowa, Northern Missouri, and a large part of Kansas.—Bacon's *Descriptive Handbook of America*. G. W. Bacon and Co.

KANGAROOS.

I HAVE lately passed a few days in the agreeable society of a well-informed and intelligent gentleman, the proprietor of a large estate in what is called Gipp Land, and another in the western district, two of the most productive in the colony of Victoria. In the extensive provinces of this district, bounded on one side by a river, his numerous herds of cattle depasture, and become fat in a very short space of time. Their grass was, however, much diminished by the quantities of kangaroos, which also fed on the productive grass. To give some idea of their extraordinary number, I may mention that one gentleman, a squatter, shipped to England in the year 1863 no fewer than 30,000 skins taken from those animals killed on his run, but which, it is to be regretted, were of but little value in this country. Extraordinary, however, as it may appear, after this large quantity had been destroyed, their number did not seem perceptibly diminished. My informant said, that in driving along the roads he had seen them as thick together as a flock of sheep. In order to show the injury they do to the cattle browses, it may be mentioned that they feed on the best part of the native grasses, where it is the shortest and sweetest. Their increased numbers may be accounted for by the destruction, by poison, of the native dogs which formerly killed many of the kangaroos, and also by the blacks being at present so few in number that they do not procure them for food as formerly was the case when they were so numerous.

The English settlers do not prize the flesh of the animal, except the tail, which is made into soups, and considered as good as ox-tail soup, although rather more glutinous.

The kangaroo is hunted by dogs which are a cross between the deer or stag-hound and the English greyhound, for it requires a very fast dog to overtake them in the chase; in fact, speed with strength. One dog by himself is no match for an old kangaroo, for it will take one of these large dogs in his forearms and run away with him with the greatest possible ease. The claws on the hind legs of the kangaroo are formidable weapons: with them they can rip up a dog, and even a man, if he happens to come in too close contact with it. The supposition that they spring from their tail is quite a mistake: they only use the tail in order to balance themselves, and also as a rudder. While running at full speed, a fence four feet six inches in height will not stop them: they will clear it with as much speed as a horse could, or perhaps with more ease than a horse.

The kangaroo, like the opossum, has an abdominal pouch. This singular animal was discovered by that great navigator, Captain Cook, in the year 1770, in New Holland, as it was then termed. Its principal progress when in motion is by leaps, and these have been ascertained to exceed twenty feet at a time; and thus it will elude the swiftness of the fleetest greyhound. The kangaroo is now known to feed standing on its fore feet, like other quadrupeds. The female has two breasts in the pouch, on each of which are two teats; and yet, strange to say, she has generally but one young one at a time. It is then excluded from her uterus and placed in the pouch, but by what process has, I believe, never yet been satisfactorily ascertained. It then scarcely exceeds an inch in length, and weighs about twenty grains. At this time, according to some naturalists, its mouth is only a round hole, only large enough to receive the nipple. It has been supposed that in the first instance it is attached to the teat by a glutinous substance which is found in the uterus. At this time, fable as it may appear (I quote from Philosophical Transactions), the forepaws are comparatively large and strong, and the claws extremely distinct, in order to facilitate the motion of the little animal during its residence in the large pouch; while the hind legs, which are afterwards to become very long and stout, are now both shorter and smaller than the others. The young one continues to reside in the pouch till it has attained its full maturity, occasionally running out for exercise or amusement; and even after it has quitted this maternal retreat, it often runs into it for shelter on the least appearance of danger.

I have been assured by an eye-witness of the fact, that when a female kangaroo, with a young one in its pouch, has been hard pressed by dogs, she has been seen to take the young with her fore feet and throw it as far as she was able on one side, so as to lighten her own burthen and thus to facilitate her escape. It has been supposed from this fact that she has but little regard for her young; but such probably is not the case, but more likely that, having evaded the pursuit of the dogs, she returns to seek her young one.

Kangaroos live entirely on vegetable substances. In their native state they are said to feed in herds of thirty or forty together, and one is generally observed to be stationed, apparently on the watch, to give alarm of approaching danger, at a distance from the rest, similarly to what gregarious birds are known to do. One writer (Labatrardière) has been of opinion that they live in burrows which they form in the ground, but I am not aware that there is any authority for this supposition. There is a smaller species of kangaroo in New Holland, about the size of a badger, which certainly burrows in the ground. Not so the larger one, which frequently is found to be as tall as a man.

The hair of the kangaroo is of a greyish-brown colour, similar to that of our wild rabbit. It is thick and long when the animal is old, but it is late in growing, and when only begun to grow is like ashy down.

The teeth of the kangaroo are so singular, that, according to the celebrated naturalist John Hunter, it is impossible from them to say to what tribe they belong. They are not ruminating animals. — Edward Jesse in *Once a Week*, February 9th.

GRASSES OF NEW ZEALAND.

In this paper the author included the natural orders Juncaceæ, Restiaceæ, Cyperaceæ, and Gramineæ, and enumerated the different genera and species he met with, and recorded the localities in which they occur. Buchanan is of opinion that some of the more fibrous Grasses (species of Triticum, Agrostis, Arundo, Danthonia) which abound on the lower hill ranges, at elevations over 1,000 feet, might be used as a source of supply of paper material. But there are various strong reasons why it is extremely unlikely these native Grasses should be able successfully to compete with other paper materials which are both much more abundant and cheaper. Several Grasses are recorded as indigenous by Dr. Hooker, which are also British : not a few British Grasses have, undoubtedly, been introduced, and are now, more or less, extensively naturalised ; while some are probably both indigenous and introduced. The problem here offers itself for solution to the local botanist—viz., whether, or how, it is possible to distinguish the native from the naturalised condition of the same species? for, on one hand, Grasses regarded by Dr. Hooker as introduced occur under circumstances in which it is, to say the least, extremely difficult to conceive of their diffusing from remote stations ; while, on the other, those recorded as indigenous are found in localities which give rise to the legitimate conjecture that they have been introduced. For instance, two British species of Festuca occur in Otago (F. duriuscula, and F. bromoides). The former is recorded by Dr. Hooker as native ; the latter as "certainly introduced and nowhere native." I found them growing in the same habitats, and intermixed ; it was impossible to determine that the one was native and the other introduced. So far as regards their botanical characters, they appear identical with British specimens, and from their occurrence on the sheep and cattle runs of settlers were probably introduced rather than indigenous. Again, Kœleria cristata is recorded in the Hand-book. Fl. No. 3 (p. 335), as native, though Dr. Hooker adds, it is "probably introduced only." But in a letter [Jan. 31, 1865] he says of it, "I have increasing reasons for considering it introduced. Nevertheless the plant occurs high on the Alps (4000 feet) of Canterbury and Otago, most remote from cultivation or settlements. Poa annua is regarded as introduced, but it was the most extensively distributed Grass I met with in Otago, growing in a great variety of habitats, and in a corresponding multiplicity of conditions. Phalaris canariensis was gathered by Foster in 1772, being before the colonisation of New Zealand (Otago was colonised so recently as 1847), but three years subsequent to Cook's first voyage (1769). It is difficult in such a case to understand how it came to be introduced, and yet it is included in Dr. Hooker's list of naturalised Grasses. I found it growing in Otago apparently as wild as those British Grasses to be hereafter mentioned, which are considered truly indigenous. Anthoxanthum odoratum has been gathered at elevations of 3000 to 4000 feet on the glacier Mount Cook (13,000 feet high). It is extensively distributed throughout New Zealand, and it is one of the Grasses I found growing in great profusion and luxuriance in several parts of Otago. Specimens indistinguishable as to size and general aspect from my Otago plant were collected by myself in 1850 on the meadows bordering the Elbe, Holstein. It is included, however, in Dr. Hooker's category of naturalised Grasses, as is also Bromus mollis, which has been found on the Canterbury Alps at 4000 feet. On the other hand, the following are recorded by Dr. Hooker as native :—Agrostis canina, Alopecurus geniculatus, and Deschampsia cæspitosa. I do not think the problem is now capable of satisfactory solution in all cases. In certain cases there may be a strong probability that the plants were introduced, such as Lolium perenne, Anthoxanthum odoratum, or Poa annua, but I do not admit the conclusiveness of the evidence according to which certain British species of Festuca, Agrostis, Alopecurus, and Deschampsia are determined to be native, and those of Kœleria, Phalaris, Bromus, and Festuca to be merely naturalised. It is equally impossible to assert that the former are not native, or the latter also native ; all that I hold is that in the present stage of colonisation—in the present state of our knowledge of the botany of New Zealand—proof of a sufficient or satisfactory kind to establish either one set of propositions or the other, is probably impossible of attainment. The New Zealand Gramineæ illustrates well that continuity of variation, so characteristic of New Zealand plants in general, which so frequently sets at defiance all the efforts of the systematist to classify particular plants or forms, whether as variety, species, or even genus. It seems to me a fruitless and absurd effort to name separately the infinite and inconstant variation forms of the supposed species or type, while the supposed book species, and even in certain cases genera themselves, are much too numerous for the proper purposes of science or the student.—*Paper Read by Dr. Lauder Lindsay at the Botanical Society of Edinburgh*, Jan. 10th.

EIDER DUCKS.

The greatest favourites and the most valuable of all the feathered tribes here are the eider ducks. Their down is the lightest and softest of animal coverings, probably the worst conductor of heat, and therefore the warmest clothing that is known. The eider down has long been one of the most important products of Iceland, and, until lately, has usually sold at several dollars a pound. The kings and princes of the north of Europe do not sleep on the down of the cygnets of the Ganges, but on and under the down of the eider duck. The increased products, the varied manufactures, and the widely-extended commerce of the world have brought into use other materials more conducive to comfort and health than the eider down; and the consequence has been, the price has greatly fallen, so that now the poor peasant can sleep on down, and it can be purchased for less than 50 cents a pound. The eider duck (*Somateria mollissima*) is a large and fine-looking bird. The male is over two feet in length, and weighs six or seven pounds. His back, breast, and neck are white, inclining to a pale blue; the sides white; the lower part of the wings, the tail, and the top of the head, black. On the water he is as graceful as a swan. The female is much smaller than the male, and differently coloured. The female is pale yellowish-brown, mottled with both white and black. The tips of the wings are white, the tail a brownish-black. But a poor idea is given, however, of the looks of these birds by an enumeration of their colours. The down is a sort of brown or mouse colour. These singular birds have both the character of wild and domesticated fowls. In the winter they are so wild that it is difficult to come near them; but in the breeding season—the month of June—they are tamer than barn-door fowls. On the islands all round Iceland, and many parts of the main shore, they cover the land with their nests. When left to themselves, the brood of the eider duck does not exceed four; but remove the eggs daily, and she will continue to lay for weeks. The drake is a very domestic husband, and assists in all the little household arrangements previous to the advent of the little ducklings. They build not far from the water, making the nest of seaweeds and fine grass, and lining it with the exquisite soft down which the female plucks from her breast. If you approach the nest—which is always near the water—the drake will give a hostile look at you, then plunge into the sea with great violence; but the female stands her ground. If in a gentle humour, and used to seeing company, she will let you stroke her back with your hand, and even take the eggs and down from under her. Sometimes she will fight and strike with her sharp beak, and she gives a blow in earnest. On finding the down gone from her nest, she plucks off more; and when the supply fails, the drake assists in furnishing it. I have been told if their nests are robbed of the down more than twice, they abandon the place and will not return there the following season. Half a pound is the usual quantity taken from a nest, and this seems a great deal, for the domestic goose, at a single picking, rarely yields more than a quarter of a pound of feathers. A greater quantity of down is gathered in wet seasons than in dry. What immense quantities of these birds come around Reykjavik and spend the breeding season, particularly on the islands of Engey and Vithey, in the harbour. Around the houses, and frequently all over the roofs, their nests are so thick that you can scarcely walk without treading on them. The inhabitants get eggs enough to half supply them with food. The eggs are the size and about the colour of hen's eggs, though not quite so white, rather inclining to a yellow. They are nearly equal in quality to those of barn fowls. After the young are hatched their education commences immediately. They graduate after two lessons. The old duck takes them on her back, swims out into the ocean, then suddenly dives, leaving the little mariners afloat. The flesh of these birds is excellent, better than any other sea-fowl. In Iceland their value is so great for their eggs and down, that there is a law against shooting them. For the first offence a man is fined a dollar, and for the next he forfeits his gun. They are greatly alarmed at guns, and, if often fired among, they quit the coast. So, with kind treatment, they give a good return; but treat them unkindly, and they will not return at all.—*Rambles in Iceland.*

THE ATMOSPHERE.

The atmosphere, or, in more familiar terms, the "element we live in," may be described as a thin, transparent, invisible, and elastic fluid. It surrounds the earth, covering the sea and land, revolves with it, and extends to a considerable height above the summits of the highest mountains. It is fluid always, from one known extreme of temperature or pressure to another. It is ponderable, and possessed of a degree of elasticity that no compression can remove or lessen. When confined, it may be reduced into any part of its ordinary bulk, however small; and when again released, it will expand to any volume, however large. When compressed it is dense, and its elasticity, or elastic force, is in direct proportion to its density, supposing its temperature to remain unchanged. If the temperature be increased, its elastic force increases; and if it be decreased, it diminishes,—in both cases at the same rate.

The atmosphere is compounded of many constituents, and is the most subtle and penetrating of the elements. Its laws have a direct bearing upon human life, and the products of the soil. Under ordinary conditions, it is the breath of our life; but when contaminated, it generates disease, and carries with it a mortal pestilence. The evil effects of impure air may be witnessed every day in the crowded habitations of the London poor: when joined with neglect and filth, the "element we live in" becomes a living poison. I have myself too often witnessed the evil-operation of air defiled by the respiration and re-respiration of individuals, confined to a small apartment.

The air so breathed is deteriorated, and deprived of the healthy properties belonging to it in nature. Inured to the morbid action of its poisonous breath, the inhabitants of a district thus defiled attest its influence in their weakly frames and pallid faces; but no outraged perceptions of taste and smell warn the sufferers of its pernicious influence, and they inhale, with blunted consciousness, an atmosphere rife with the germs of fever and premature decay.

But the same atmosphere, unsullied by human neglect and sordid necessity, exists in its fullest purity for miles as we ascend, to a height greater than man has yet gone or can go. Colourless when near, its transparent depths are the medium of reflected colour, which, as we ascend beyond the influence of earthly vapours, deepens to an intensity of blue we know nothing of below.

The air is a blending of subtle gases, of which more than 99 per cent. consists of oxygen and hydrogen, a great part of the remainder of aqueous vapour and carbonic acid, with other gases in very small proportions. These quantities prevail at all elevations, whether among mountains, or vertically in space, up to the greatest height which has yet been attained. With these aëriform fluids the waters of the earth mix in alterable proportions, according to the process of evaporation. Invisibly suspended, the aqueous vapour of the atmosphere varies in quantity according to the season of the year and the hour of the day; its regulating power is temperature, which, as the air becomes cooled, condenses vapour into visible form and substance.

For miles above the earth a variable quantity of water is mixed with the air. It is this union of two dissimilar fluids, which produces the whole visible phenomena of cloud, haze, fog, &c. Whenever the temperature of the air declines from any cause, the moisture which at the higher temperature was in the invisible form of vapour, is condensed, and assumes the visible shape of clouds.—*James Glaisher, F.R.S., in Good Words*, Feb.

SUB-TROPICAL PLANTS.

The taste for this class of plants, though but of recent devolpment in this country, is increasing, so thae it may be as well to specify those kinds which may b quickly raised from seed, and are likely to produce e satisfactory effect. Unquestionably the most effectiv and the cheapest of all are the rather numerous form or varieties of the castor oil plant, Ricinus communis They are cheap, and may be raised on heat as freely as pickling cucumbers, while the fine effect they produce must be remembered by every visitor to Battersea Park sub-tropical garden. Next in importance come the numerous kinds of Cannas, so extensively employed in Paris, and of late years about London. Nothing can be better adapted to relieve the monotony of the flower garden and diversify it with graceful verdure than these. They should be raised on a brisk hotbed, pit, or warm stove in early March, and encouraged to grow freely and without check in every way, till turned into a cooler structure about May to "harden off" a little previous to being turned out in rich beds in a warm-sheltered situation in June. After these the best are Artemesia annua, a green and graceful bush, quite a free growing annual, grows six feet high or more in good ground; Aristolochia Sipho, a hardy, great-leaved climber, fine for covering arbours, high trellis work, &c.: Carduus marianus, the milk thistle; Onopordon acanthium, the great cotton or Scotch thistle, fine when seen isolated among green shrubs. Numerous kinds of Cucurbita or gourd, both large and small kinds, as nothing can be better adapted for running over trellis work, banks of rich ground, pyramidal beds, or many positions, while the fruit of all is ornamental and of most edible. Ferdinanda eminens, the tall plant, used so much at Battersea; Gynerium argentum, the pampas grass, surely as "sub-tropical" in effect as anything can be; the stripped Japanese maize, for choice positions, and for placing among not over-vigorous neighbours; the Virginian tobacco, which is very effective in leaf when grown in rich ground, and not by any means to be despised as a flowering plant; the summer cypress (Kockia scoparia), which forms a neat little green pyramid; Salvia argentea, a hardy, free-growing thing that forms very large silvery leaves spreading flat upon the ground; Solanums in variety, and particularly robustum, marginatum, macrophyllum, and verbascifolium; Wigandia caracassana, a magnificent thing, requiring, however, good culture; and Chamapeuce diacantha, a very extraordinary thistle-like subject.

Along with these we will enumerate the best of the bedding plants that furnish effect in our parterres from their leaves alone, or at least those of them that may be raised from seed. They are as follows:—Amaranthuses, and particularly A. melancolicus ruber, Artemesia argenta (not much used, but good—raise in heat, and preserve over the winter). Atriplex hortensis rubra (good, but rather coarse), the two Centaureas, ragusina and gymnocarpa. These may not be fit for much the first year of raising unless sown early, and they are now pretty cheap as plants; but it is as well to state that they may be raised from seed. Cineraria maritima (a well-known silvery edging plant), Chenopodium atriplices (a free-growing annual, with a peculiarly pleasing tint over the tops of the shoots), Perilla, Oxalis tropæoloides (a low, dark-leaved trailer, very useful), Santolina inanca, and Cerastiums Biebersteini, and tomentosum.—*Field*, Jan. 26.

How to Forecast the Weather.

The following were among the maxims of the Meteorological Department in determining their forecasts. They are selected and re-arranged from the digest made by the committee and appended to their report. It is to be hoped that meteorologists will both amend and add to this imperfect list, on which the committee remark :—"Some of these maxims rank among the long-established truths of meteorological science, while others are clearly open to considerable doubt." I. Atmospheric or air currents.—In the latitude of the British Isles, and of North-Western Europe generally, there are two, and only two essentially different atmospheric currents—one S.W., running from the equator towards the pole, and the other N.E. ; running from the pole to the equator. The characteristics of the S.W. current lie not only in its general direction, but in its quality ; for it is light, warm, and moist. In other words, its presence is shown by a low barometer, by a high thermometer, and by a small difference between the wet and dry bulb thermometers. The characteristics of the N.E. current, in a similar way, lie not only in its general direction, but also in its quality, for it is heavy, cold, and dry. In other words, its presence is shown by a high barometer, a low thermometer, and by a large difference between the wet and dry bulb thermometers. The weather in this country depends almost wholly on the conflict, combination, alternate preponderance, or alternate succession, of portions of these opposite currents. Not only is the actual presence of either current shown by its corresponding instrumental tests, but an approaching change from one current to the other is foretold by the instruments beginning to change their indications. (Hence, as changes of weather must necessarily commence at some places earlier than at others, there is great advantage in receiving by telegraph information of the state of the weather, and of the instruments at many stations.) When S.W. and N.E. currents alternately prevail, the wind blowing over any station has a strong tendency to "veer," and not to "back." That is to say, the general order of the changes is N.E.S.W.N,, and not N.W.S.E.N. II. Weather changes—Gradual changes of weather are shown by a gradual rise or fall of the barometer ; for instance, at the rate of one-hundredth of an inch in an hour. Great differences of temperature at the same, or adjacent places, are followed by changes of weather. Rapid changes of all kinds commonly presage violent atmospheric commotion. The result of all rapid changes in the weather, or in any of the instrumental indications, is brief in duration ; whilst that of a gradual change is more durable. III. Direction and Force of Wind—The wind usually blows from a region where the barometer is high to one where the barometer is low. The force of the wind is usually proportionate to the differences of barometric pressure at adjacent places. In other words, the greater the barometric tension the stronger the wind. Strong winds are far more steady in duration than light or moderate winds. IV. Gales or Storms—Great storms are frequently preceded by excessive meteorological disturbance, as by heavy falls of rain or snow, by much lightning, by unusual cold, or excessive heat. Sea disturbance often precedes gales. Great storms are usually shown by a fall of the barometer exceeding one inch in 24 hours, or by a fall of nearly one-tenth of an inch in an hour. The barometer frequently continues high during a N.E. storm, but there is a fall of the thermometer. Most of our violent storms travel bodily in a N.E. direction. V. Calms—Calms may be due to either of three different states of weather—1, the appulse of winds coming together from opposite quarters ; 2, the divergence of winds going towards opposite quarters ; 3, the centre of cyclonic storms. The barometer rises in 1, and sinks in 2. It is extremely low in 3. When the S.W. and N.E. currents intermingle, water is precipitated in the form of cloud, rain, or snow.—*Gardeners' Chronicle*, Feb. 2nd.

The Wild Goat.

The best modern account of the wild *C. ægagrus* is by Captain T. Hutton (in the second volume of the "Calcutta Journal of Natural History") who observed it in Afghanistan, where he possessed a tamed buck, which he figures in outline from the living animal, and we are indebted to him for a coloured figure of the same individual, which few persons would hesitate to refer to a domestic goat of some kind, by no means extraordinary in its appearance. This animal stood 3ft. 1in. at the shoulders, and the horns of a particularly fine specimen in the British Museum measure 50in. round the arched curvature, and would have grown at least six inches more ; they were in their ninth year of growth : beard about 1in. long. "The shoulder," remarks Captain Hutton, "has every appearance of great muscular power, and is, what in a horse would be termed heavy. The neck also is massive, doubtless for the purpose of enabling it to support the enormous horns which grace its head. The hind-legs are generally kept somewhat in a crouching attitude, as if ready for a sudden spring in case of alarm. This attitude imparts a wildness to the general character of the animal, and at the same time gives it the appearance of being much higher at the withers than at the croup, and the back consequently appears to slope gently from the shoulders to the hind-quarters. This feature is much heightened by the occurrence along the back of the neck and shoulders of long hair, which stands up erectly, so as to form a well-marked mane, which, when the animal is alarmed or angry, becomes a very prominent character. This mane is dark-coloured, and forms part of the black dorsal line. The head is usually kept stretched out, as it were, and the expression of the face is gentle though somewhat wild. The attitude when on the alert, and springing fearlessly from crag to crag in the rocky fastnesses, where it delights to roam, is bold and haughty, giving an idea of great muscular strength and agility, which indeed the animal possesses in no ordinary degree, but its speed is not sufficient when it descends to the plains to preserve it from the greyhound. It is, however, only when driven from his haunts by the intensity of the winter that he condescends to visit the lowlands, and that but rarely happens. The usual pace of this animal is a kind of canter, which among the hills enables it rapidly to evade pursuit, but is not nimble enough, nor is the stride sufficiently long to suit it to the plain lands, though for scaling mountain heights it is admirably adapted. The leaps which they take are tremendous, and almost pass credibility."—*Land and Water*, Feb. 2nd.

ANCIENT ECLIPSES.

A short time before his decease the late Dr. Hincks communicated to the Royal Academy of Sciences at Berlin a paper "On a newly-discovered Record of Ancient Lunar Eclipses," which has just been published in the *Monatsbericht* of the Academy. He made the discovery in the last volume of the "Cuneiform Inscriptions of Western Asia," published by the British Museum, during a particular search for all the inscriptions that appeared to have an astronomical character. Among a great deal which he confesses he does not understand in plate 39, No. V., described as part of an astronomical tablet, he met with three statements, "the meaning of which appeared to him absolutely certain." They are as follows :—"In the month Nisan, on the fourteenth day, the moon was eclipsed." "In the month Tisri the moon was eclipsed." "In the month Sabat the moon was eclipsed." To the second of these statements a sentence is added in the original, explaining that "the moon emerged from the shadow while the sun was rising." Having published in the *Transactions of the Royal Irish Academy* a table by which the commencement of each Assyrian year might be ascertained, Dr. Hincks set himself to a careful investigation of these eclipses, with a view to fix the date of their occurrence. If that could be done, highly valuable conclusions would be obtained, of which astronomers would be only too glad to avail themselves. After an elaborate calculation, the details of which are given in the paper, he satisfied himself that the three eclipses had been seen as described, that the second occurred about the time of sunrise, on the 13th of September, 701, at the beginning of the reign of Sennacherib. Such an eclipse is so very unusual, that, if seen, Dr. Hincks assumes it would certainly be recorded, and he asserts that at the date above given, "this phenomenon was visible *somewhere* under the parallel of Nineveh." And he continues, "According to Hanson's Tables, the moon would be very far, perhaps half a degree, beyond the place which would allow the phenomenon to appear in the longitude of Nineveh. If, then, it be a fact that it was observed there, it furnishes astronomers with a most important datum for correcting the lunar tables." Dr. Hincks expresses his belief that professed astronomers will find it possible to reduce all the observations of the eclipses which he has mentioned to harmony with calculations by adopting the values of certain specified coefficients of Prof. Adams ; and by computing all the elements of the eclipse for a time later than that of the actual time of observation by a small fraction of a day, multiplied by the square of the number of centuries from A.D. 1800. He points out that this last correction, which acts in the opposite direction to Adams's, is due to the retardation of the diurnal motion caused by the tides. These are the leading facts of this interesting communication ; for the profound technical arguments by which the author's views are supported, we must refer the reader to the paper itself. Who would have expected when Mr. Layard began his excavations at Nineveh that they would give up particulars of eclipses which happened 700 years before the Christian era, and supply to astronomers of our day a means of rectifying one of the most important questions in their favourite science ?—*Athenæum*, Feb. 9th

THE OPOSSUM.

The Opossum is another extraordinary animal, with a pouch for the reception of its young. Mr. Hunter tells us that he was so fortunate as to ascertain the size and weight of several embryos immediately after their exclusion from the uterus. One of them only weighed a grain. The weight of the six other young ones was but little more than this. The young opossums, unformed and perfectly without sight as they are at this period, find their way to the teats by an invariable instinct. They continue about fifty days in the pouch, when they attain the size of a common mouse ; then they begin to leave the teats occasionally, but return to them again till they are about the size of rats. Their eyes open about the end of fifty days from their first reception in the pouch. The animal attains its full growth in about five months.

The opossum is distinct from all other animals, for there is not one that it can be immediately classed with, except it is a second degree from the monkey. It is supposed that they pair. They eat fruits of all kinds. It is about the size of a small cat, and when on the ground it appears to be very helpless, but it is able to ascend trees with great facility. It hunts after birds and marmots, and is destructive to poultry. It will put on a semblance of death when in danger. They are very tenacious of life : there is an old saying, "If a cat has nine lives the opossum has nineteen." Their flesh is white and well tasted, and is by some preferred to pork.

There is something in the mode of propagation in this animal that deviates from all others. It is known to be extraordinary, but the investigation has never been completed. Mr. Hunter tells us that he has endeavoured to breed them in this country, having brought a great many, and had friends who assisted him by bringing them or sending them alive, yet he never could get them to breed.

As the female opossum has a false belly, it may be supposed that she does not make any nest for her young, but carries them from place to place. The male opossum has a small tendency to a pouch on the belly.

It is to be regretted that we have not more decisive knowledge of the animals of New South Wales ; as they are, upon the whole, like no others that we are acquainted with. They occupied much of Mr. Hunter's attention, but he evidently failed in classing them to his satisfaction.—*Once a Week*, Feb. 9th.

DISEASES OF PLANTS.

If we now examine the first deviations from normal phenomena which are exhibited in the occurrence of internal diseases, as for instance in smut (Uredo segetum), in decay, as in the stems of Cacti, juicy fruits, &c., or in the potato murrain, we find in every case that the nitrogenous lining of the cells first becomes discoloured, assumes a darker tint, a firmer consistence, a more evident granulation, and that it begins at the same time to percolate and saturate the cell-wall, so that it ceases to exhibit its pure reaction on the cellulose. These phenomena are so general that we may well suppose that all inward diseases of plants actually derive their origin from an abnormal condition of this coat, and inasmuch as the peculiar power of the chemical process in the cells is apparently concentrated there, its deprivation first calls into existence the symptoms of disease which are perceptible at a later period in the other portions of the cells. The comparative luxuriance of plants depends upon the inorganic matters presented to them in the soil. The proportional rarity of phosphates in most geological formations, and also in the soils which are wholly or principally formed from them, is well known; on the contrary, they are accumulated in soils principally formed of decomposed vegetable matter, after being slowly collected by the plants. Animal excrements are very rich in these salts, and therefore manured fields, and especially gardens, contain a greater proportion than is normally present in plants, or can be consumed by them. But the influence which inorganic substances in the soil exercise on vegetation depends upon their being generally present. For since plants have not the power of choosing their own nutriment, and since the proportions in which soluble substances present themselves for absorption can be altered by endosmose within very narrow limits, it is equally important that the substances which are requisite for plants should be contained in the soil in something like the proper proportions, since the plants are otherwise compelled to receive matters in greater quantities than is agreeable to their normal structure, and in consequence inevitable anomalies take place in their vital action. The sum of what has been said may be stated thus:—The more phosphates are relatively increased in any soil in consequence of its mode of formation or cultivation, the more will the plants which it sustains have a tendency to deviate from their original type, to form sub-species and varieties, and finally to be attacked and destroyed by internal disease.—*Journal of Agriculture for Nova Scotia.*

FISH IN CEYLON.

Ceylon, rich in forms of animal and vegetable life, continues to afford fresh instances of novel characteristics worthy of note; for example:—recent observation confirms the fact of the natives being in the habit of digging for fish; a place is selected on comparatively firm ground, where swampy land is covered with a rank vegetation for some years; and having heard the fish beneath his feet breathing (for they are an air-breathing variety of *Ophiocephalus* and *silurus*—three species in all), the native proceeds to break down the soil for some little distance all around the place, filling up the belt he makes, with the tall reed-stems, and so making a kind of barrier, through which the fish don't escape, as it seems they might if they tried. Then he proceeds to thicken the swampy soil by the addition of some dry earth, till it becomes of the consistency of thick mud, thicker than the liquid part, and nearly as thick as that lying below. He also places layers of reeds at right angles, to make a kind of network horizontally; and nothing then remains to be done but to wait for the fish, whose coming is indicated by bubbles of air rising to the surface, each fish making bubbles peculiar to its species. Presently the *silurus*' head appears, and then the native catches him, as he cannot withdraw, owing to the network through which he has just forced himself. At Callura there is a *siluroid* fish (water-breather), whose eggs, about the size of small grapes, are sold as food to the villagers; and these eggs are emitted from the mouths of captured fish, where they are carried during the process of hatching! The Rev. Mr. Boake, long resident at Ceylon, has given the most patient attention to these facts, and has collected specimens from the mouths of the parent fish. The eggs are produced in the ordinary way. The parent-fish are plump, and good to eat at the commencement of the season, but soon grow lean and ill-conditioned, from the want of power to feed for so long a time. One fish, nine inches long, had thirteen eggs, in which some were more advanced than others. The embryo's blood-vessels in the umbilical sac is plainly seen in some; the head and tail have already escaped from others; and besides this, the fish carrying these mouthfuls of eggs are all males. Dr. Günther describes a South American species of *Arius*, to which the Ceylon species belongs, as identical in this peculiar habit of carrying the ova in the mouth. Dr. Boake tried several experiments to test the vitality of air and water breathing fishes with fatal success.—*Land and Water*, Jan. 12.

INSTINCT IN A PIKE.

When Dr. Warwick was residing at Durham, the seat of the Earl of Stamford and Warrington, he was walking one evening by the side of a fish-pond in the park and observed a large pike of about six pounds' weight, which darted hastily away, and in so doing struck its head against a tenter-hook in a post and fractured, as it afterwards appeared, its skull and turned aside its optic nerve. It seemed to be in great agony: it first rushed to the bottom of the water and bored its head into the mud, thickening the water so that it was for a time lost to sight; afterwards it plunged about hither and thither, and at last threw itself completely out of the water upon the bank. The doctor examined it and found that a small portion of the brain was protruding from the skull, and succeeded with the aid of his toothpick in replacing it, and then put the fish into the pond again. At first it seemed relieved and was quiet, but in a few minutes darted about again till it threw itself out of the water a second time. Again the doctor did what he could for it, and put it back into the water; but it was stlli furious with pain, and afterwards threw itself out of the water several times. At last, with the assistance of the keeper, the Doctor contrived a bandage for its head, and left the fish in the water to its fate. He, however, took care to visit the pond on the following morning, when the pike came up towards him close to the edge, and, as he said, actually laid its head on his foot. He examined the fish's skull and found it likely to do well. Afterwards he walked backwards and forwards along the bank of the pond for some time, and the fish continued to follow his movements, turning as he turned. Next day he took some friends to see it; it came up to him as before: and at length it grew so docile that it would approach whenever he whistled and feed out of his hands, though to other persons it continued shy.—*Rev. J. S. Wanson's Reasoning Power of Animals.*

MAMMOTH TREE.

A great wonder of the vegetable world is the mammoth tree in California. A grove of 427 trees, the largest of which are 30 feet in diameter, and 300 feet in height, is in Mariposa county. It is the largest species of tree in the world, and this is the largest collection. The grove is about 20 miles from the Gosemite Valley, and about 4,500 feet high, on the western slope of the Sierra Nevada. When the traveller enters the grove he sees on all sides of him these huge giants of the forest, varying from 20 to 34 feet in diameter, and from 275 to 325 feet in height. The grove covers a space half-a-mile wide and three-quarters of a mile long. There is one tree 34 feet in diameter, two trees of 33 feet, thirteen between 25 and 33 feet, thirty-six between 20 and 25 feet, and eighty-two between 15 and 20 feet. One very large tree has fallen, and a considerable portion of it has been burned, but appearances indicate that it was nearly forty feet in diameter, and 400 feet high. The mammoth tree is found only in a few small groves, of which six or seven are known, though probably there are others in unexplored parts of the Sierra Nevada. The Calaveras Mammoth Grove was the first discovered, and attracts the greatest number of visitors. There are in this grove ten trees 30 feet in diameter, and eighty-two between 15 and 30. One of the trees which is down must have been 450 feet high, and 40 feet in diameter. The Horseback Ride, one of the notabilities of the place, is a hollow tree which a man on horseback can ride through. One tree which was stripped of its bark for a height of over 100 feet continued green and flourishing two and a half years, and some of its branches remained green seven years late.—*Bacon's Guide to America.*

New Books.

[*Our limited space must of necessity compel us to give but very short notices of new books, but they will perhaps serve as a guide as to what books our readers may ask for at their libraries.*]

A Journey to Ashango Land, and Further Penetration into Equatorial Africa. By Paul B. Du Chaillu. London: John Murray.

The above volume has no doubt been anxiously looked for, and accounts of the wonders therein contained has probably by this time afforded amusement and instruction to many. Such a work would require many pages of our magazine to do it justice, therefore we can do little more than inform those of our readers who are not already acquainted with the fact that it is now to be obtained at all libraries.

Most of the supposed fables detailed in M. Du Chaillu's "Equatorial Africa" have been corroborated by other eminent men, so that the present work, if it does not create as much excitement as the previous one, will at all events be read as a truthful description of a strange and wonderful country. Those who endeavoured to detract from the truth of M. Du Chaillu's former work will do well to read the manly and excellent preface to the present volume.

The gorilla is here again described in his native home. Also a further account of the curious potamogale velox, which we give on another page; as also the nest of the mushroom-hived termes. It may interest many of our fair countrywomen to learn that the present beautiful fashion of adorning the head was in vogue during M. Du Chaillu's visit, as may be seen in the following description of an African tribe—

The Ishogos are a fine tribe of negroes; they are strongly and well built, with well-developed limbs and broad shoulders. I consider them superior to the Ishiras in physique, and I remarked that they generally had finer heads—broader in the part where phrenologists place the organs of ideality. With some of them their general appearance reminded me of the Fans. The women have good figures: they tattoo themselves in various parts of the body—on the shoulders, arms, breast, back, abdomen; and some of them have raised pea-like marks, similar to those of the Opono women, between the eyebrows and on the cheeks. Both men and women adopt the custom of pulling out the two middle incisors of the upper jaw, but this mode of adding to their personal attraction is not so general as among the Aponos; many file their upper incisors and two or three of the lower ones to a point.

The men and women ornament themselves with red powder, made by rubbing two pieces of bar wood together: but their most remarkable fashions relate to the dressing of the hair. On my arrival at Igoumbié I had noticed how curious the head-dresses of the women were, being so unlike the fashions I had seen among any of the tribes I had visited. Although these modes are very grotesque, they are not devoid of what English ladies with their present fashions might consider good taste; in short, they cultivate a remarkable sort of chignons. I have remarked three different ways of hair-dressing as most prevalent among the Ishogo belles. The first is to train the hair into a tower-shaped mass elevated from eight to ten inches from the crown of the head, the hair from the forehead to the base of the tower and also that of the back part up to the ears being closely shaved off. In order to give shape to the tower, they make a framework generally out of old pieces of grass cloth and fix the hair round it. All the chignons are worked up on a frame. Another mode is to wear the tower with two round balls of hair, one on each side above the ear.

A third fashion is similar to the first, but the tower instead of being perpendicular to the crown is inclined obliquely from the back of the head, and the front of the head is clean shaven almost to the middle. The neck is also shorn closely up to the ears.

Those who procure the book will find illustrations of the different styles of chignons.

The Wild Elephant, and the Method of Capturing and Taming it in Ceylon. By Sir J. Emerson Tennent, Bart. London: Longmans and Co.

Everyone who takes an interest in one of the most intelligent and sagacious of animals should possess the above little work, issued at a price to suit most pockets. The author says: "In this volume the chapters descriptive of the structure and habits of the wild elephant, are reprinted for the sixth time from a larger work published originally in 1859. Since the appearance of the first edition, many corrections and much additional matter have been supplied to me chiefly from India and Ceylon, and will be found embodied in the following pages."

It would appear that the elephant found in Ceylon is identical with the one found in Sumatra, which differs in many material points from those found in India and Africa—for particulars of this curious problem we must refer our readers to Sir Emerson Tennant's preface, where also is related the curious fact of an elephant leaping a barrier nine feet in height, an extraordinary leap for such a weighty and unwieldly animal.

The work is divided into two parts of three chapters each, the first describing its habits in a state of nature; the first chapter of which relates to its structure and functions; the second, its habits when wild; and the third to elephant shooting. The second part treats of the mode of capture and taming. Subdivided, the chapters are—1st, an elephant corral; 2nd, the capture; 3rd, taming, and conduct in captivity.

Upon another page will be found some anecdotes collected to show the reasoning power of the elephant. The following account as witnessed by Major Skinner may be well added to those facts:—

The case you refer to struck me as exhibiting something more than ordinary brute instinct, and approached nearer to reasoning powers than any other instance I can now remember. I cannot do justice to the scene, although it appeared to me at the time to be so remarkable that it left a deep impression upon my mind.

In the height of the dry season in Newera Kalawa, you know, the streams are all dried up, and the tanks nearly so. All animals are then sorely pressed for water, and they congregate in the vicinity of those tanks, in which there may remain ever so little of the precious element.

During one of those seasons I was encamped on the bund, or embankment, of a very small tank, the water in which was so dried that its surface could not have exceeded an area of 300 yards square. It was the only pond within many miles, and I knew that of necessity a very large herd of elephants which had been in the neighbourhood all day must resort to it at night.

On the lower side of the tank, and in a line with the embankment, was a thick forest, in which the elephants sheltered themselves during the day. On the upper side, and all round the tank, there was a considerable margin of open ground. It was one of those beautiful, bright, clear moonlight nights when objects could be seen almost as distinctly as by day, and I determined to avail myself of the opportunity to observe the movements of the herd, which had already manifested some uneasiness at our presence. The locality was very favourable for my purpose; and an enormous tree, projecting over the bank, afforded me a secure lodgment in its branches. Having ordered the fires of my camp to be extinguished at an early hour, and all my followers to retire to rest, I took up my post of observation on the overhanging bough; but I had to remain for upwards of two hours before anything was to be seen or heard of the elephants, although I knew they were within 500 yards of me. At length, about the distance of 300 yards from the water, an unusually large elephant issued from the dense cover and advanced cautiously across the open ground to within 100 yards of the tank, where he stood perfectly motionless. So quiet had the elephants become (although they had been roaring and breaking the jungle throughout the day and evening) that not a movement was now to be heard. The huge beast remained in his position still as a rock for a few minutes, and then made three successive stealthy advances of several yards (halting for some minutes between each with ears bent forward to catch the slightest sound) and in this way he moved slowly up to the water's edge. Still he did not venture to quench his thirst, for though his fore-feet were partially in the tank, and his vast body was reflected clear in the water, he remained for some minutes listening in perfect silence. Not a motion could be perceived in himself or shadow. He returned cautiously and slowly to the position he had at first taken up on emerging from the forest. Here in a little while he was joined by five others, with which he again proceeded as cautiously, but less slowly than before to within a few yards of the tank, and then posted his patrols. He then re-entered the forest, and collected round him the whole herd, which must have amounted to between 80 and 100 individuals—led them across the open ground with the most extraordinary composure and quietness, till he joined the advanced guard, when he left them for a moment and repeated his former *reconnoissanee* at the edge of the tank. After which, having apparently satisfied himself that all was safe, he returned, and obviously gave the order to advance, for in a moment the whole herd rushed into the water with a degree of unreserved confidence so opposite to the caution and timidity which had marked their previous movements, that nothing will ever persuade me that there was not rational and preconcerted co-operation throughout the whole party, and a degree of responsible authority exercised by the patriarch leader.

The Reasoning Power in Animals. By the Rev. John Selby Watson, M.A., M.R.S.L. London: Reeve and Co.

Mr. Watson has here given us a wonderful collection of anecdotes illustrating the intelligence of animal life, showing how very near (if they do not really possess) they approach to what man alone believes himself to be master of—the power of reason.

Descartes and many others were of opinion that all the lower animals are mere unreasoning machines, as much as a clock or watch; that all their actions may be explained by the laws of mechanism; that many things doubtless they do better than man could do them, but that they do these things only, and cannot learn to do others; showing that they do not act from thought or judgment, but from mere instinctive use of their organs. Our author is not of the same opinion, and after reading his volume most people will agree with him that there is often something more than instinct, wonderful as that power is, in many of the ways of animals.

Of the examples selected for illustration the dog, as we may suppose, stands pre-eminent, there being no less than fifteen chapters devoted to him: next in importance is the elephant, about which there are five chapters. The two occupying half the volume, the rest—some eighteen chapters—contain a motley collection of beasts, birds, and fishes: amongst which are the lion, tiger, glutton, racoon, beaver, ox, sheep, pig, hare, wolf, cat, fox, rats, mice; robins, tomtits, swallows, parrots; carp, mullet, salmon, eels, walrus; bee, ants, spiders, butterflies, &c.

Bacon's Descriptive Handbook of America. By G. W. Bacon, F.R.G.S., and W. G. Larkins, B.A. Crown 8vo. With numerous Maps, Engravings, etc. London: Bacon.

The above contains in a small volume a quantity of matter suitable to the tourist, capitalist, or emigrant, and those who remain at home but take an interest in the welfare and success of the great nation across the Atlantic. Everything peculiar to the country and the people is here collected, condensed, and arranged in such a form as to make it a complete *vade mecum* of information, and in a way that deserves the highest praise and commendation.

In its pages will be found a description of the early settlement, physical and political geography, agriculture, manufactures, commerce, finance, education, religion, laws, institutions, characteristics, etc. The maps consist of a large one of the whole country (size 18 by 28 in.) and four smaller ones, illustrating the physical features, the geology, the agriculture, and the six groups of states.

The Open Polar Sea: a Narrative of a Voyage of Discovery towards the North Pole in the Schooner United States. By Dr. I. I. Hayes. London: Sampson Low, Son, and Marston.

A personal narrative of a voyage to the Arctic regions, in order to complete the survey of the north coast of Greenland and Grinnell-land, and to make such explorations as might be found practicable in the direction of the north pole. The volume forms a valuable addition to our works on the Arctic regions. The scenery is well described, and the physical forces which characterise that portion of the globe ably explained. The purpose of the voyage being scientific, it may be imagined that much valuable information has been collected. It is written in a lively and spirited manner, and the author carries the reader interested with him to the end, and leaves him to regret that there is no more.

Lima: Sketches of the Capital of Peru, Historical, Statistical, Administrative, Commercial, and Moral. By Manuel A. Fuentes. London: Trubner.

The above is intended to place before the reader an accurate and faithful description of the capital of Peru and its inhabitants. A fairy land (the author says), whose very name has become a proverb, but which has been constantly misrepresented by the narratives of fantastic voyagers, who, being thoroughly ignorant of the country, have mistaken mere accidental circumstances for the general characteristics of its inhabitants.

The volume is full of illustrations, depicting the principal buildings, gardens, etc., and a goodly number of portraits of the *belles* of Lima.

The following works, likely to interest our readers, have appeared during the past few weeks:—

A Companion to the Weather Glass, designed to record, Numerically and Graphically, the Natural Phenomena presented by the Barometer, Thermometer, Rainguage, Clouds, Winds, &c., with Calendar, Plates, and Engravings. By Rev. R. Tyas, M.A., Cantab., F.M.S., &c. London: Bemrose and Sons, 21, Paternoster-row.

The Royal Atlas of Modern Geography. By A. Keith Johnston, LL.D., F.R.S.E., &c. Dedicated by Special Permission to Her Majesty. Imperial folio, half bound in russia or morocco, £5 15s. 6d. With Index of 150,000 Names contained in the Atlas. William Blackwood and Sons, Edinburgh and London.

Descriptive Astronomy. By George F. Chambers, F.R.A.S., of the Inner Temple, Barrister-at-Law. 21s. Macmillan and Co., London.

The Past and Future of the Kaffir Races. In Three Parts. By the Rev. William C. Holden. With Map and Illustrations. (Published for the Author).

The Elements: an Investigation of the Forces which determine the Position and Movements of the Ocean and Atmosphere. Vol. II. By W. L. Jordan. 4s. 6d. Longmans and Co.

The Heavens: an Illustrated Handbook of Astronomy. By Amédée Guilleman. Edited by J. Norman Lockyer, Esq., F.R.A.S. Royal 8vo, 200 Illustrations, 21s. London: R. Bentley.

Episodes of Insect Life. By Acheta Domestica. Edited by the Rev. J. G. Wood. 21s. London: Bell and Daldy.

Transactions of the Zoological Society of London. Vol. VI., Part II., price 36s., containing Professor Owen's Paper "*On the Osteology of the Dodo.*" With Ten Plates. London: Longmans and Co.

The Open Polar Sea: a Narrative of a Voyage of Discovery towards the North Pole. By Dr. Isaac I. Hayes. With Illustrations. 8vo., cloth, price 14s. London: Sampson Low.

New America. By William Hepworth Dixon. Third Edition. 2 vols., demy 8vo. With Illustrations, 30s. London: Hurst and Blackett.

Practical Chemistry. By Stevenson Macadam, Ph.D. London: Chambers.

[NOTE.—During the past month we have received several letters asking us to give prices to the books we publish a list of; it is not a usual course, but we see no reason why it should not be adopted if of benefit to our readers.—ED.]

Correspondence.

[*Under this head we shall be glad to insert any letters of general interest.*]

CHANGE OF HABITS OF ANIMALS.

SIR,—In 1801 the population of Glasgow was 84,000, in 1861 it amounted to 446,000, and now it is estimated at half a million. One consequence of this enormous increase in population, is, that the filth and stench of the river Clyde is in summer almost intolerable, and a large margin of flat sandy shore is exposed at low water, from Bowling to Greenock, more or less covered with deposits of slime mixed with garbage—organic matter in every stage of decay, excellent food for the gull, which picks up almost anything animal.

Within my own recollection the gull and birds of like feather have augmented in numbers on the Shores of the Clyde, almost, it seems to me, at the same ratio as that of the great city itself. Here, then, is a new feeding ground for this animal, and a new kind of food. At best it is a poor diver, and this new kind of food will not make it any more expert at diving, but rather tend to enfeeble, by disuse, muscles formerly so employed.

In consequence of its numbers increasing so much on the banks of the Clyde, I have observed it of late much more frequent on the tributaries of that river; for instance, on the Cart to Pollockshaws and upwards, and on the Brock, a small tributary of the Cart.

These waters are so polluted by chemical dyestuffs that no trouts are to be found in them, scarcely even eels, so that their bill of fare must differ considerably from that afforded by clearer and purer streams; but, pressed by numbers, worms on the adjoining parks and any dead floating garbage on the rivers are thankfully received by the emigrants. Yarrell records that when this bird was fed on corn the walls of the stomach were found, on dissection, to be thickened, and I can easily allow of some slight change of organization incident on any animals' change of food or of habits. Thoughtless persons tell us that the fauna and flora, remains of which are found in the pyramids of Egypt, are the same as those found now. I do not think they are likely to be quite the same if the circumstances be much altered. The beaver loses its building habits and becomes solitary, where much persecuted, just as man himself does. Animals when pressed apply to new sources of subsistence, like individuals of our own species. The crow took to turnips during the severe winter of 1826, some *genius* among them having likely led the way, for every bird fancier knows that there are differencies in the mental constitution of birds.

I know a case where weasels having multiplied considerably and being pressed by the wants of their large families, after having stocked their nests to no purpose, the mouths were so many, (for weasels have foresight often in stocking their larders,) dared in their hunger to venture on the untried; and fixing themselves on the cheek, nose, and underneck of the minister's cows at night, damaged them considerably. Their blood-thirsty new invention was discovered, cartfulls of dried whins were set fire to around or above their supposed nests, and the whole country was up, each rustic armed with a bludgeon, and hundreds of the little philosophers were sacrificed over the head of their selfish and daring discovery.

J. S.

Dumfriesshire, 13th February, 1867.

INSECT LIFE.

SIR,—Deriving much pleasure from the contemplation of insects and their habits, I, as an "Entomophilist," shall be glad of occasional information concerning them, from yourself or such of your readers as claim to be Entomologists.

While strolling in a garden in Suffolk one pleasant day last summer, my attention was arrested by the sight of an insect emerging "tail-first" from a hole in the sandy path at my feet. When clear of the hole, my little miner instead of flying off as I expected, merely made a dart of a few inches from the ground, at the same time throwing from him, or dropping, quite a shower of grains of sand and dirt, which he had evidently been excavating in the hole. On thus ridding himself of his load, he (taking no notice of me, although I had stooped to within a foot or so of the ground) as quickly returned, and plunging head first into the narrow opening was quickly out of sight. In a few seconds he again emerged with another load, which he discharged as before. Thus he continued to labour for some minutes, during which time the surface of the surrounding path was becoming strewn with the granules of earth, so laboriously "brought to light." I watched the industrious fellow carefully, to detect if possible how he contrived to bring up so many of these little dry detached masses at a time as he did, but could make nothing of it beyond seeing that his legs were crossed or bent under him, so as to form a sort of basket. His flight was so quick and so sudden that it was difficult to perceive the exact arrangement. Having bored the hole to the required depth and deposited an egg or eggs on the bottom thereof (I presume), this female miner or civil engineer flew off once more, this time to a short distance, and on her return brought with her a stone or lump of dry earth, which she placed over the mouth of the scene of her labour and her love; this piece was presently supplemented by other and smaller pieces, until the opening was so completely and cleverly closed and hidden that I could with difficulty discern it after taking my eyes off the spot. And now for a few words upon the labourer herself. And here I now regret that I did not at the time take more accurate notes of her size, formation, &c. The general appearance of the creature was that of a common wasp, but considerably larger and more slender. It had the same yellow and black banded body, the same narrow and strongly nerved wings, the same fierce and defiant looking eyes, and strong mischevious jaws. I did not attempt to catch it, and so cannot say whether it had a ting or not. In length it was nearly or quite n inch, the body being slender and the abdomen elongated. It would seem to be carnivorous, for I afterwards saw one of the species with a fly which it had caught in its jaws. Perhaps some of your scientific readers may be enabled from this meagre description to determine the genus and species, and inform me through your pages.

Worcester. W. H. ADE.

DERIVATION OF WORDS.

SIR,—Referring to Mr. Ade's letter (N.N.B. p. 51), there is, I think, little doubt, that the prefix "horse" was originally used to denote size or coarseness in a species, by way of distinction from the ordinary species.

In Todd's Johnson's Dictionary, 2nd edit., 1827, it is stated, under the title "Horse":—"Joined to another substantive it signifies something large or coarse. The prepositive 'horse' is applied to denote several things large and coarse by contradistinction. Thus in the vegetable kingdom we have horse radish, horse walnut, horse chestnut. In the animal world there is the horse emmet, horse muscle, horse crab."

The same Dictionary gives us: "horse cucumber; a large green cucumber,"—"horse emmet; a species of large ant."—"horse mint; a large coarse mint,"—"horse muscle; a large muscle or shell fish." Webster's Dictionary gives these words also.

In addition to these instances, I may mention that the horse mackerel is described in Maxwell's Wild Sports of the West as a coarse species of mackerel, often caught with the common mackerel, off the coasts of Mayo.

There is also a fungus, called in many parts of England the horse mushroom. It is a larger species than the common mushroom, and, I believe, not fit to eat.

A large species of leech, found in some of our ponds, is called the horse leech. Possibly, in this instance, however, the name may be thought to refer to the notion that the creature sucks the blood of drinking horses.

Finally, I may mention that the original main channel to the Port of Liverpool was sometimes called the Horse Channel. No large ship could, in former times, enter the port, except by that channel, and I fully believe that the prefix "horse" was, in this case, used to denote size, in contradistinction to the other channel, which admitted small craft only.

I am, Sir, &c.,

Esher, 18th Feb. T.

SIR,—Upon seeing the letter of W. H. Ade, in the 2nd number of the "Note Book," I have great pleasure in sending you the following probable derivations of the words "Gooseberry, Strawberry, Raspberry, Cranberry, and Wortleberry." The following *derivations* are taken from Richardson's English Dictionary.

(1.) *Gooseberry.*—Perhaps *gorse-berry;* so named from the prickliness of the wood. Skinner thinks so called, because the juice of these *berries*, when half ripe, are the best sauce to a *goose.* Junius suspects that the name was original *groisberrie*, corrupted from the French *groiselle*, and that by a further corruption our *gooseberry* was formed. English gardeners say from its thick skin.

(2.) *Strawberry.*—All that I can find about this word, is that it means "to scatter *seed.*"

(3.) *Raspberry.*—The fruit is so called, perhaps from the *rasping* roughness of the wood (*rasp* meaning to *rub*).

(4.) *Cranberry.*—Of the derivation of this word I cannot find anything.

(5) *Wortleberry.*—The word *Wort* applies to any plant that rises out of the ground.

I hope the above may be of use to Mr. W. H. Ade; and,

I remain, Sir, yours, &c.,
ALEXANDER W. M. CLARK-KENNEDY.
Eton, Feb. 14th, 1867.

SIR,—Referring to a query in No, 2 of the "N. N. B.," by W. H. Ade, concerning the etymology of the words Gooseberry, Strawberry, Raspberry, Cranberry, and Wortleberry, I beg to offer the following opinions:—1st. In Gooseberry, the prefix goose is a corruption of gorse, prickly, so called from the prickly nature of the shrub. 2nd. Straw in Strawberry is analogous to our word strew, so called from the creeping nature of the plant. 3rdly. Rasp in Raspberry means rough, so called from the roughness of the fruit. Wortleberry is derived from the Saxon Heortberg. Hartberry, called Hartberry, I suppose, because the stags used to feed upon it. Cranberry is Crane berry. Hoping these answers will meet with W. H. Ade's approval,

I remain, &c.,
E. A. D.

WHAT ARE SHOOTING STARS.

SIR,—The following, which appeared about three months ago in an Australian paper, tends to confirm the suggestion made by F. A. A. in No. 2 of the N. N. B. that meteors usually reach this earth in a state of powder:—

"Increase in the size of the earth. Some very curious speculations have lately been put forth by M. Dufour concerning the increase in the size of the earth. Will it be believed that the size of our globe is increasing in bulk year by year, owing to the quantity of meteors (falling stars) which are projected into it from the regions of space? M. Dufour has made calculations showing that the earth sustains an annual increase equal to 114,400,400th of its weight. It appears that nearly two cubic metres of meteoric dust fall upon every acre of the earth's surface in the course of a single year. It is stated that in some parts of England this meteoric dust may be found in accumulation nearly a foot deep.

"The French Stire or Cubic Metre is equal to 35·3174 cubic feet."

I am, &c.,
D. C. STEWART.

HABITS OF SQUIRRELS.

SIR,—I find that the story of the squirrels crossing the river on their bark canoes is given in Cassell's Popular Natural History, vol. 1, p. 30. "Scheffer in his 'History of Lapland' cites Olaus Petri as witness" to the fact. The common squirrel, however, which in the winter changes to a light steel grey, seems to have been mistaken for the grey squirrel which is only found in North America.

The story, no doubt, may be classed with that of the Nautilus; which in the main is true, though it has been adorned with some poetical embellishments.

I am, Sir, yours truly
GULIELMUS.
Faversham, Kent.
Feb. 15th, 1867.

TO CORRESPONDENTS.

J. S. CALDWELL (Studley),—Wells' New Physiognomy is published at 14s., and Redfield's Comparative Physiology at 25s.; you can obtain them at Messrs. Trübner's, 60, Paternoster Row.

COCK ROBIN.—The prices are given where possible. The best weekly papers are the *Field* and *Land and Water;* monthly: *The Intellectual Observer*, 1s. 6d., *Nature and Art*, 1s., *The Zoologist*, 1s., and, occasionally, *The Annals of Natural History*, 2s. 6d.

R. K.—Dr. Ecklow, a Cape botanist, when shown the aloe tree, considered it to be the kakir boom, or quiver tree (*Aloë dichotomo*), but Dr. Hooker thinks it a new species.

A CHESHIRE BEE-KEEPER.—Many thanks for your letter; the question of feeding is a vexed one; with regard to covering you cannot do better than place a common earthenware pan over the hive. It is too late to open a discussion upon the subject.

S.B.—The question is more suitable for a debating society; we should think iron.

A LOVER OF FLOWERS.—Many thanks for your interesting letter.

W. M. STEPHEN.—Too late for insertion in this number, shall appear in the next.

Short Notes.

UP IN THE CLOUDS.—We had risen to a height of three miles; our boots were sheathed with ice. Sound was sharp and clear, and divided the keen moist air with a ringing echo. Stratus below, cirrus above; a sea of clouds around, 1000 feet in depth, and underneath, the surface of the earth, without a ray of sun, murky and dim. The scene around possessed elements of grandeur which bore no relation to the sun-rise of earth. Grouped around the car, above and below our level, were summits of Alpine cloud, sloping to their base in glistening plains of light, or towering upward from sheets of stratus which descended to earth, or the more simple form of mist and haze, which still clouded the atmosphere below. High overhead floated the cirrus in the deepening azure of the morning light. Thus we were conscious of height and distance, in the position of the clouds, their structure, and the true bulk which they attain. Light and colour helped us to explore their territory; and in the kingdom of illusive forms we realised the finest applications of the principles of colour and the force of contrasted shadow. Colour has always seemed to me a distinctive beauty in a field of vapour. Clothed in hues of neutral grey, the clouds are tinged with the prevailing blue of the atmosphere. Immersed in a transparent medium, they receive upon their surface remote modifications of the reflected glories of sunrise and sunset. Without traces of local colouring, a field of cloud looked down upon from above is diversified with hues allied to the tertiary divisions of the chromatic scale. In one glance I have seen olive, russet, and citrine, together deepening into grey or bluish shadows. Should the sun be setting, it gilds the brown, pale shadows of the topmost clouds, and will show probably wreaths of newly-forming vapour, ready to descend, and crown the topmost summit of Alpine peaks, which rear themselves from a mass of dense shapeless shadows in the grey obscurity of formless clouds. I am speaking now as an observer among the clouds, where the line of the horizon is the circumference of a circle, of which the balloon itself marks the centre.—*Good Words*, Feb.

THE KROOMAN.—In the first place, the Krooman is free, and is deeply insulted by the term "nigger," for on this coast nigger means slave. During his term of service in the capacity of "boy," a large proportion of his pay is appropriated by his "headman" and relatives. When he at length gains age and experience enough to be employed as headman himself, he in his turn receives from those under him a proportion of their wages; and, after a few voyages in this capacity, will have gained enough to stay at home with his wives and family. There he is the laziest being in existence, lies by the fire smoking and drinking when he can get rum and tobacco, and sleeping all day long when these luxuries are not attainable. His only excitements are the arrival of a ship from which he may get a "dash" or present for hiring his boys; and the quarrels in which he is either politically or privately engaged. For the villages all along the Kroo coast (or Grain coast) are in a state of perpetual feud, and make war ferociously on one another in the cruel and treacherous African style, showing no mercy, and expecting none. Their private quarrels, like these of the more civilized portion of mankind, are almost always about women or money. In a country where polygamy is the rule, and no guarded harems exist as among the Turks; where the old man is rich and buys many wives, and the young man is poor and cannot buy any, the marriage vow, as may readily be imagined, is very often broken. The punishment is a fine, but no divorce follows, the wife being a valuable chattel, and not an expensive luxury; and the result of the *liaison* (being also valuable) is adopted by the owner of the frail spouse. There is also another rock on which a Krooman may split. If he outstrips his fellows in the race, if he is rich and prosperous, and in the vanity of success becomes purse-proud and overbearing, envy and malice enter into the hearts of his neighbours, and the first case of death by disease is used as a pretext "to make witch palaver for him"—*i.e.*, to acuse him of witchcraft. He is arraigned before a tribunal of enemies thirsting for his death and their share of his effects. The fatal trial poison is administered with no doubtful result, and his wives, children, cattle, and goods are divided among his judges.—*Land and Water*, Feb. 9th.

HARDY FERN-LIKE PLANTS FOR THE FLOWER GARDEN.—I have more than once drawn attention to several good things in this way, and particularly to Thalictrum minus, which, while growing freely in ordinary soil in the full sun, and being perfectly hardy and permanent, I have proved affords us a beauty almost identical with that of Adiantum cuneatum, and which may be made the nicest use of by the flower gardener. In consequence of recommending it so strongly through various channels, there have been many demands for the plant which nurserymen are not at present able to comply with, though I learn that somebody has lately got a stock. The plant is to be had in abundance in some parts of Britain, particularly in the north and north-west. It is also freely found in Ireland, and is abundant in the Lake District, growing high up amongst T. alpinum, and a taller and coarser species. Once established, the only thing that need be done is to pinch off the growing flower stems, and thus keep the poor little flowers out of sight. The Italian Isopyrum thalictroides is dwarfer in growth and with a similar aspect, though the leaflets are larger. It is grown in most botanic gardens, and may doubtless be had in profusion in its native country. It would form a graceful dwarf Fern-like fringe, but is not equal to my favourite T. minus when once firmly established in nice cushionary tufts. I doubt if we shall ever surpass or equal that as a nice Fern-like plant for the flower-garden. The Isopyrum must also have its young flower shoots pinched carefully off. But I now write to particularly recommend another Fern-like plant for the flower-garden, quite distinct in aspect from either of the foregoing, but likely to furnish a most useful Fern-like effect. It is Spiræa Filipendula, the Dropwort—either the single or the double kind will do—and the plant is rather frequent wild in England. The leaves are cut into deeply toothed segments, will of course stand any amount of exposure, are pleasing in outline, lasting in character, and certain to produce a capital Fern-like effect of the pinnated type. Pinch off the stems and you will then have no further trouble in producing a dense green margin with this plant. The leaves will grow from 5 to 8 inches long according to the soil. The flower gardener who is at all inclined towards variety and interest, can of course make a tasteful use of these plants. I may add that I have used the leaflets of T. minus among flowers with good effect; they are of a more lasting character than those of the Fern.—*Gardeners' Chronicle*, Feb. 9.

THE POTAMOGALE VELOX.—The 28th of December was a happy day to me, for I succeeded in what I had been long wishing for, the acquisition of specimens of the curious otter-like animal *Potamogale velox*. It was one of my most interesting discoveries on my former journey, and I had given a description of it which was published in the *Proceedings of the Boston Society of Natural History for* 1860 (vol. vii. p. 353). I had been unable to bring home more than a skin of this animal; and when it was made the subject of one of the ungenerous attacks made at that time upon me, I was unable to produce evidence, in a skeleton or specimen of the perfect animal, of the truth of the account I had given of it. I had examined the living animal, and had described it from remembrance as allied to the otters. But my critic, from an examination of the skin, only ridiculed my statement, and declared that it did not even belong to the order under which otters are classed, but was a rodent animal. He proposed even to do away with the name I had given it, and to call it Mythomys, in commemoration of my supposed fabulous statement. It may be imagined, then, how glad I felt in obtaining two specimens of the Potamogale. I preserved the skeletons as well as the skins of both, and wished that I could at once have sent them to London to vindicate my statements. Some weeks afterwards, when at Máyolo, I obtained four more specimens. The Potamogale lives in many of the shady and rocky streams near Olenda, gliding under water with great velocity after its prey. On opening the stomachs of all my specimens, I found only freshwater crabs in those I found at Olenda. At this season of the year, the waters are all turbid with the floods, and I imagine that the Potamogale, unable to find fish, which are his ordinary food, has to content himself with crustacea, which he finds about their holes, under the rocks and stones on the banks of the rivulets. Three of those found at Máyolo had fish in their stomach, and one had crustacea. The animal is not found in the Ngouyai or other large rivers of the country, but is confined to the smaller streams. In the dry season it is seldom to be found anywhere.—*Du Chaillu's Ashango Land.*

EXPERIMENTS WITH TRICHINA SPIRALIS.—The experiments made with birds were negative, and this so far agrees with the experience of continental observers, Professors Pagenstecker and Fuchs, who, though they found that the ingested muscle Trichines acquired sexual maturity within the intestinal canal of their avian hosts, yet never found young Trichinæ in the muscles of the birds, nor any evidence of an attempt on the part of the escaped embryos to effect a wandering or active migration on their own account. Carnivorous mammals, and especially those which subsist on a mixed diet, appears to be the most liable to entertain Trichinæ. It is, however, possible to rear flesh-worms in herbivora; though on account of the expense comparatively few experiments have been made in this direction. "It is quite clear that in their natural state herbivorous animals can seldom have an opportunity of infesting themselves, whilst the reverse is the case with swine, carnivorous mammals, and ourselves." Looking at the subject in relation to the public health, the author observed, that he had no hesitation in saying that a great deal of unnecessary fear had been created in this country. English swine are almost entirely, if not absolutely, free from this so-called disease, and not a single case of trichiniosis in the living human subject has been diagnosed in the United Kingdom. Some 20 or 30 have been discovered *post mortem*, and it is highly probable that most, if not all of these individuals, have contracted the disease during life, by eating German pork sausages or other preparations of foreign meat.—*Paper read by Dr. Cobbold before the Linnaen Society, Jan. 17th.*

ORCHIDS.—The family of Oncidium has a wide geographical distribution in the New as well as in the Old World. The only genus that bears comparison at all with it in this respect, is that of Epidendrum. There is scarcely a field of importance that has come under the investigation of our enterprising and intrepid collectors but has furnished some individual of interest or beauty, to our rich European stores. It may have been found in close proximity to the snow-capped ridges of the almost inaccessible mountains that dot the surface of Central America, which are within the icy grasp of a polar atmosphere, many of them remarkable, as is well known, for their tremendous volcanic eruptions. That the family connection is a large one may be taken for granted when we know that one or other of them are found in Brazil, Mexico, Oaxaca, Guatemala, New Granada, Ocãna, Peru, Panama, Surinam, Jamaica, and Tropical America generally—a range which includes such a variety of climate, verging upon the line of both extremes of a polar and tropical temperature, as to demand something like a systematic arrangement in our endeavours to naturalise them. There is this difficulty—and it is one that is not easily bridged over—the want of complete data for cultural purposes. Any one possessing the slightest knowledge of the geography of the earth can well understand the dilemma of a cultivator, who is handed half a dozen species or varieties of Orchids, and simply told they were found in Mexico. He introduces them into a "convalescent home," and is expected, with the knowledge he may already possess of plants in general, to be able, by wise means, to recruit subjects exhausted to the last degree of physical energy, and restore them to their wonted health and vigour, so that they may increase in bulk and periodically produce flowers. The gardener may probably succeed, but don't abuse him if he lamentably fails; for most of the climates of the earth are to be found on the surface of Mexico.—*Gardeners' Chronicle*, Jan. 26.

SHRUBS SUITABLE FOR SHRUBBERIES.—Those that I am about to describe are very hardy, evergreen, good growers, even under shade and under the boughs of deciduous trees. They are all three very ornamental, and I think I could make a beautiful fox or game covert out of them. The first I name is the Berberis vulgaris; it is the most shrubby of all known plants. It is easily propagated by cuttings, layers, and distribution of the roots. It gives yellow flowers in May; its leaves are like ash leaves. The next I mention is Cotoneaster, with box-like leaves, white flowers, and coral red berries. This is the best of all trailers, and quickly grows, and propogates itself by layers and also by seeds. I should think it would help to make up a famous jungle. The last is common Aucuba, with splotched, laurel-like leaves. This also is propagated by cuttings, layers, and division of roots. The first and last are here; the second I made use of at my late residence at Rushton to ornament an unsightly wall, by allowing it to grow up behind a wire trellis, and very well it answered the purpose. The first and last will grow eight feet high, and the other will trail almost any length, and spread in all directions. I should not think that rabbits or hares would eat either of them. The aucubas and plants of the Berberis vulgaris here do not appear to be affected by this severe weather. The thermometer in my cold vinery to-day (Monday) was two degrees below zero; and in seven minutes from the time that I placed it out of doors, six feet high, the quicksilver fell to six degrees below zero.—*W. F. Radclyffe.—Field*, Jan. 26.

JUPITER'S SATELLITES.—An astronomical phenomenon, of which two observations only are on record, will occur during the present year—namely, the simultaneous disappearance of Jupiter's four satellites. On August 21st the planet will appear to lose its moons for nearly two hours; three of them disappear by passing across its face; the fourth will be masked by its shadow. If the weather be favourable, the disappearance and re-appearance may be witnessed in this country.—*Athenæum*, Jan. 26.

Remarks, Queries, &c.

(*Under this head we shall be happy to insert origina Remarks, Queries, &c.*)

THE SPARROWHAWK.—The sparrowhawk (*accipiter nisus*) belongs to the order of Raptores or prey catchers, and to the family Falco; he is No. 15 on the list of British birds.

Comparatively few people know the sparrowhawk by sight, but almost all who do know him like to see him. A few months since while walking along the road I saw a lark flying towards the road, about 50 yards before me, closely followed by a brownish bird with a speckled breast, which I recognized as a sparrowhawk. Just as the lark was flying over the wall of the road and within a foot of it, the sparrowhawk seized him in his talons, and making a most beautiful curve upwards soared back over the oat field. But finding apparently his prey too heavy he settled on the ground to examine it, when either dissatisfied with it or frightened by me he flew off indignantly to the nearest wood, and the lark fluttered along and hid in a sheaf of oats.

Unlike the kestrel, the sparrowhawk is a very silent bird; only once do I remember hearing his harsh, shrill, short cries.

One evening last spring I went birdnesting, or (as it is the fashion to call it now) to seek specimens of oology for my cabinet. I went to L—a—e Dene, and on getting about 500 yards down it I saw up a fir tree what I thought was a ringdove's nest; on climbing up, however, I found it was a sparrowhawk's. The following are the notes I took at the time:—

"Took a sparrowhawk's nest composed entirely of dry twigs of the fir from a fir tree in L—a—e Dene, which contained 5 eggs. Three of them are blueish white, blotched with a ring of brown round the large end; the fourth has the ring round the small end; and the fifth has a broad band of light reddish brown round the middle." The nest as stated above is made entirely of fir twigs, without any other material, its dimensions are diameter 2 feet, hence (7 : 22 :: 2 :) $6\frac{2}{7}$ feet is the circumference, and its depth is 10 inches, the cavity in which the eggs lay is 5 inches in diameter, its depth half an inch.

From the above it will be seen that the nest is a large structure. Now, in all the Ornithological Works I have seen the sparrowhawk is described as either taking a crow or magpie's nest for its home, or building one "like a ringdove's, flat and shallow, in low trees." Can any one give me any information on the subject.?

BADGER.

RARE BIRDS IN LEADENHALL MARKET.—During the past few months I have obtained several *rare birds* in the Leadenhall Market, which have been sent up from the country with the game and poultry, viz.:—

Spotted Crake, Temmincks Stint (Tringa Temminckii), several specimens of the Goosander (Mergus Castor), and a few Bitterns (Botaurus stellàris), which most likely come from Holland. I also obtained 2 specimens of pied Blackbird, male and female, both in good plumage. I think that anyone living in the neighbourhood of London would have a good chance of collecting some very rare spimens of birds in the market, and at a very little cost, as the poulterers are often ignorant of the value of these birds.

Perhaps it would be worth mentioning that the Tringa Temminckii was sold to me for a snipe, for a few pence. ORNITHOLOGIST.

"E. S." sends us the following queries for solution:—1st.—"If you look at a lamp burning clearly, you can see no smoke issuing distinctly from the chimney; but viewing the reflection of it in a looking-glass you can see the vapour ascending to a considerable height." 2nd.—"In Australia it is said that the barometer *rises* before bad weather and falls before good; the reverse of what takes place in England." If this is true what is the cause of this difference?

As they are both interesting subjects, perhaps some of our readers may like to send us their opinions.

Atoms.—Referring to the extract "An Atom," on p. 53 of N. N. B., the words, "for, knowing the behaviour of a living atom, and knowing all the forces which affect a dead one, &c.," seem to me misleading. I would ask, can atoms, as such, be considered as either alive or dead absolutely; are they not simply indifferent? that is, can only be considered alive or dead, as they form portions of live or dead masses. I hold that atoms are, as far as we can test or conceive, always active, for we find that in a dead mass the activity of the atoms is displayed as powerfully and incessantly as in a living mass, only, acting and re-acting under a new set of conditions. I am aware how difficult it is to discuss or examine such a subject in brief, but have thought it well to at least draw attention to the implied erroneous notion, as I think.

Mr. A. Gaudin's ingenious but, I fear, fallacious calculations on the number and size of the ultimate atoms, &c., is very provocative of remark, but I dare not venture upon criticism, beyond briefly saying that there can be little doubt that the "*ultimate* atoms" of *all* the elements are of the same size, in short identical, and that the differences we observe are due entirely or mainly to the varying rates of movement and systems of combination existing therein. W.H.A.

Winter Aconite.—"Amateur" will experience no difficulty in cultivating the Winter Aconite, as it grows freely in common soil. That in which it grows best is a moderately rich and slightly tenacious loamy soil. R. K.

I think "Amateur" will find no difficulty in growing the winter aconite in any ordinary garden soil, as I have seen them grow and flower freely in various parts of the country. They would *prefer* a light, free soil, loam, or otherwise; in short, anything but a cold, wet, heavy soil would suit them. W. H. Ade.

The winter aconite is very common, and likes almost any soil. It thrives best when *not moved* for many years, like the Christmas Rose it is one of the few things that may be moved while in blossom. A Lover of Flowers.

Origin of the word Gooseberry.—In Timbs' Nooks and Corners of English Life, gooseberries are said to have derived their name from being used for stuffing roasted geese.

D. C. S.

Potato Disease.—"A Lover of Flowers" wishes to know if any of our readers can give any information as to the potato disease.

STATE OF THE WEATHER NEAR LONDON.

Jan. and Feb.	Moon's Age.	Barometer.		Temperature.					Wind	Rain.	Remarks.
				Of the Air.			of the Earth				
		Max.	Min.	Max	Min	Mean	1 foot deep	2 feet deep			
Thurs. 17	11	29.536	29.430	34	20	27.0	38	38	N.	.00	Partially overcast; frosty; snow flakes falling; fine.
Friday 18	12	29.636	29.447	34	11	22.5	38	38	N.	.00	Hazy, with small granular snow; slight haze; very fine.
Satur. 19	13	29.810	29.636	35	16	25.5	37	38	N.E.	.00	Hazy and frosty; hazy; fine at night.
Sunday 20	○	29.865	29.832	32	25	28.5	37	38	N.E.	.00	Frosty; overcast; frosty wind; overcast throughout.
Mon. 21	15	29.860	29.815	30	20	25.0	37	37	N.E.	.00	Frosty and stormy; boisterous; overcast at night.
Tues. 22	16	30.000	29.810	45	21	33.0	37	37	E.	.12	Overcast; frosty; densely overcast; drops of rain at night.
Wed. 23	17	29.650	29.525	52	34	43.0	37	37	S.	.01	Densely overcast; hazy; fine; slight rain.
Thurs. 24	18	29.442	29.437	54	34	41.0	37	37	S.W.	.00	Densely overcast; fine; with clouds; fine.
Friday 25	19	29.766	29.398	52	44	48.0	36	37	S.W.	.00	Foggy; hazy clouds; very fine.
Satur. 26	20	29.993	29.840	53	38	45.5	37	38	S.W.	.14	Hazy; uniformly overcast; rain at night.
Sunday 27	☾	29.955	29.845	56	47	51.5	38	39	W.	.02	Densely overcast; cloudy; overcast; slight rain.
Mon. 28	22	29.962	29.797	53	34	43.5	40	42	S.W.	.00	Clouds in strata; cloudy and rather boisterous; fine.
Tues. 29	23	29.793	29.789	52	45	48.5	42	42	S.W.	.00	Fine; densely clouded; boisterous and overcast.
Wed. 30	24	29.959	29.851	51	34	42.5	46	42	S.W.	.47	Fine; showery; heavy rain in afternoon.
Thurs. 31	25	30.122	29.985	45	32	38.5	46	43	W.	.10	Fine; very clear; overcast; rain at night.
Friday 1	26	30.062	30.031	48	40	44.0	45	43	S.W.	.00	Hazy; drizzly and foggy; overcast.
Satur. 2	27	30.413	30.176	48	25	36.5	46	43	W.	.00	Fine; exceedingly fine throughout.
Sunday 3	28	30.457	30.195	50	29	39.5	45	43	S.	.01	Clear and frosty; very fine; overcast.
Mon. 4	●	29.700	29.482	51	32	41.5	45	43	S.W.	.08	Densely clouded; very boisterous and wet; fine at night.
Tues. 5	1	29.417	29.014	50	33	41.5	45	43	S.	.14	Fine; rain; boisterous; hurricane in the night.
Wed. 6	2	29.056	28.808	51	31	41.0	45	43	N.W.	.04	Boisterous and wet; clear, cold, and boisterous; fine.
Thurs. 7	3	29.406	29.626	54	36	45.0	44	43	W.	.22	Clear, with scattered white clouds; rain at night.
Friday 8	4	29.981	29.328	53	40	46.0	45	43	W.	.02	Very boisterous and showery; fine; lightning at night.
Satur. 9	5	29.971	29.768	55	42	48.5	46	44	S.W.	.06	Fine; very fine; densely overcast.
Sunday 10	6	30.161	29.943	55	35	45.0	46	43	S.	.21	Cloudy; overcast; boisterous; with rain at night.
Mon. 11	7	30.166	29.911	53	40	46.5	46	44	W.	.02	Quite clear; fine, with clouds; slight rain.
Tues. 12	☽	30.168	30.152	55	42	48.5	46	45	W.	.00	Overcast; uniformly overcast; cloudy.
Wed. 13	9	30.324	30.164	52	43	47.5	47	44	S.W.	.00	Slight drizzle; hazy; densely overcast.

ICELAND: ITS BIRDS AND ITS FLOWERS.

THE central deserts of Iceland are unexplored. A man must be bold, and singularly favoured by weather, to investigate their mysterious recesses and to return with life. One region, part wild tumbled snow and glacier mountains, part plains of bristling lava, is as unknown as the heart of Africa. The glimmer of silver peaks has been seen from afar, across an impassable arm of lava; the confines of the great sea of molten matter has been skirted; but those billows of black, ragged stone have never been traversed, even in the old venturesome days of Iceland. Sometimes violent shocks and a rising column of black cloud warn distant settlers that volcanic fires are still active in the heart of that fearful wilderness; then the one great river Jökulsá, which flows from its mysterious depths, is tinged with volcanic ash, and swollen with melted snows; then, too, the night sky gleams scarlet over some unvisited, unknown, yawning crater, which is pouring forth its flood of molten rock.

This sea of lava sweeps up to the roots of a chain of snow mountains perfectly unexplored, themselves volcanoes ready to toss aside their mantles of white, and spread destruction for miles round.

To the west of this vast region of lava and snow, lies an upland desert of black sparkling sand, stretching completely across the island. This sand is volcanic, and has been deposited during outbursts of the neighbouring mountains, when the clouds rain down sand till the ground is covered many feet deep, and every particle of vegetation is destroyed. I had an opportunity of observing a cutting made by a stream in this district, and I found traces of three several depositions of volcanic dust, the last as much as thirteen feet deep. Vegetation advances in Iceland with none of that rapidity with which it covers the flanks of Vesuvius, and sand in Iceland is many hundreds of years old before it becomes covered with a scanty growth of marram and moss campion.

Part of this elevated table-land of desert is studded with countless lakes of all shapes and sizes,—disconnected, landlocked; some, quiet tarns of crystal clear water, others winding among the hills, ruffled and tossed into angry waves by the cutting blasts which howl over the waste. This wild region is utterly barren. The hills are bare, exposed stone, broken into angular fragments, and torn into gullies by the melting snows of spring. The elevated plains are masses of splintered trap and black mud, into which a horse will flounder to its belly. The dales are occasionally grey with moss, and partially clothed with stunted willow.

But every spring-thaw helps to destroy the little amount of vegetation which exists, as the icy water tears down the hill slopes and rips up the moss, or bears away the sandy soil in which the willow found root.

It must not be thought that a mossy, willowy bottom is common. You may travel all day without coming to one, but a few do exist, known only to certain individuals who haunt the waste during the summer, gathering the *lichen islandicus*, or seeking swans. This region bears some resemblance to the Siberian tundras, but it is more barren. The tundras are moss-covered, and nourish herds of reindeer; but the "*heidis*" of the centre of Iceland could not support any quadruped. For the most part this desert is devoid of living creatures, for birds will not frequent spots where there is no vegetation.

Wherever a morass of moss, blaeberry, and willow is to be found, however, multitudes of wild fowl congregate. The lakes teem with red-fleshed alpine trout and magnificent char, and where the fish are, there are to be found the swan and the diver. Swans breed in considerable numbers among these lakes, unmolested except by a hardy native who may venture into the wilds to shoot them for their feathers. The swan is of only one species, the *cygnus musicus*: some naturalists have asserted that another species is to be found in the island, but the natives are very positive that one kind only visits the island, and certainly amongst those which I saw, I noticed none but the Hoopers. Glorious, indeed, is the note, shrill as a trumpet-call, uttered by this majestic bird, when the labours of incubation are completed, and it sings its pæan of triumph over its fledglings. The swans generally are in pairs in a lake: among these tarns it is rare to find more than one couple to each sheet of water. An attempt on the part of a second pair to intrude is resented as an intrusion, the swans regarding the lake, as an Englishman regards his house—as a castle. But this is not the case always. I counted some eighteen swans on the great lake in the Vatnsdalr; but there the sheet was extensive. Perhaps the reason of the tenacity of the swans on the *Arnarvatn heidi* to their rights is the scarcity of provender, and they may be aware that what is enough for two, would be starving for four.

Another bird frequenting these lakes, also in couples, is the Great Northern Diver, a magnificent fellow in gorgeous metallic glitter of green and black, his wings and back sprinkled with white, and his breast of spotless purity. The size of the bird is great, his neck and head well-proportioned, the latter narrow and armed with a pointed dark-coloured bill, and furnished with bright crimson eyes, like rubies. The diver is a heavy bird, and a clumsy walker: but he flies well, though low, rising when alarmed from his lone dark pool with a weird cry, mingled with gulping whoops, like the laughter of a fiend. The diver is a very powerful swimmer, and it is difficult for a boat to keep up with him. He laughs at a storm, dancing like a cork on the waters, plunging through the waves, and appearing on the other side with a fish in his mouth, which he swallows with a toss of his head.

In the neighbourhood of the lakes where there is vegetation the wimbrel stands on his long legs, uttering his wild sad cry, and seeming quite unconcerned if you present your gun. Have him we must, for we depend entirely for provisions in these wastes on what we shoot; and wimbrel, though stringy and tasteless, is not to be despised when little else is to be got. Ah! we have disturbed a covey of ptarmigan. They looked like grey stones, crouching so unconcernedly on the ground as we rode by. But the ptarmigan is sure before long to give notice of his presence, for he is proud of his voice, and one might pass within a few feet of the bird without noticing him, but for his telltale call—riö, riö, riö—which has given him his name in Iceland of Rjupr. We catch the zick-zack of the snipe in yon morass, and the ceaseless melancholy pipe of the golden plover sounds from every stony hill around the tarn. Just here there is abundance of life; a gun-shot beyond the top of the rise you will not see or hear a bird. If you are lucky, you will catch sight of the great snowy owl, like a snowball sailing by, uttering its solemn note. Its haunts are somewhere among the unvisited, unknown recesses of the vast Jökulls which close the view on the south.

Here, close to us, is a little snow bunting, sitting wagging its tail and cheeping; lucky bunting that you are! had the owl but seen you, you would not be perched so unconcernedly there. How tame the little being is, or rather how stupid; you have only to steal up softly whilst it is occupied cheeping, and you can catch it in your hand. These rocks around us harbour countless buntings, but their nests are so far in among the crevices that it is a difficult matter to obtain an egg.

Have done with the birds: let us take a glance at the flora of this wild spot. This is scanty. The very moss in some places is turned black as coal by the icy tricklings from the snow, and it is only where there is a dry sheltered spot that any flowers can blossom. There are a few. The pale blue butterwort (*Pinguicula alpina*). on its sickly leaves, trembles timorously in the piercing blasts which roll over the Jökulls, and yet bravely endures them. I do not think the little flower has as cheerful a hue here as in the south. It seems blanched with cold. The grass of Parnassus is also to be found, but the little bullet heads are not yet unfolded. On a southern slope of volcanic ash a scanty growth of creeping azalea may be discovered, and a few varieties of heath which I cannot identify just now, as they have not yet flowered. In the marsh at the head of this tarn, in which my poor ponies are wading after the young willow tops, I find the bog-whortle and the blaeberry, now coming into flower (*Vaccinium myrtillus*, *V. uliginosum*, *V. vitis idæa*), and I light upon a bunch of *Bartsia alpina*, its rich plum-coloured flowers just beginning to open. On the lava rocks, especially when old, may be seen masses of pale *Dryas octopetala*—a glorious flower, with its eight delicate milky petals and its sunny eye. Nowhere have I seen this plant in such perfection as in Iceland; the blossoms are larger there than I have seen in the Alps or the Pyrenees, but probably the volcanic constituents of the rock on which it lives are those best suited for its development. We may find a few saxifrages also, but they are more plentiful elsewhere than upon this desert. However the *Saxifraga hirculus*, *S. aizoides*, *S. nivalis*, *S. hypnoides*, *S. cæspitosa*, and *S. tridactylites*, may be discovered with a little trouble. One flower, however, which is sure to attract the eye, is the dwarf campion (*Silene acaulis*), of all gradations of colour, from pure snow-white to carmine pink, in dense masses of little blossoms, studding the sand, and growing where nothing else can grow. Brave, bonny little plant! I have become attached to it from association, as it has cheered my eye, wearied with the unrelieved monotony of black wastes for miles and miles in Iceland. —*Good Words.*

BRITISH SHREW-MICE.

These curious little animals are regarded by some persons as being actually mice, on account of their somewhat mouse-like form, though they belong in reality to the insectivorous order, which in Britain comprehends the shrews, the hedgehog, and the mole, and has not the slightest affinity to any of the rodent types. The genus *Sorex* is characterised by having the ears and eyes small, the snout singularly elongated, and tapering to a point; the tail long, slender, and somewhat quadrangular in form ; the feet short, with five toes, the claws being compressed and acute. The dentition consists of two incisors in each jaw ; the upper ones are curved and notched at the base ; the lower ones are elongated and almost horizontal, the upper edge being serrated in some species ; these are followed by three, four, or five præmolars on each side above, and two below. These teeth have been regarded as lateral incisors by some zoologists. The true molars are four on each side above, and three below. The shrews are all plantigrade, and possess clavicles.

The common shrew (*Sorex araneus* of most authors) is extremely common in most parts of England, frequenting hedges and moist pastures, and feeding on worms, the larvæ of insects, and young frogs and lizards. In procuring the former, its long, flexible snout is of great service for burrowing and rooting in the loose soil. This species breeds in the spring and summer, producing two litters of from four to seven each. There is generally, from some hitherto unexplained cause, a periodical mortality among these little animals in August or the beginning of September, at which period numbers are found dead along pathways and the sides of roads, in most cases displaying no external injury. Many hypotheses have been started to account for this sudden death of so many, the real reason being, in my opinion, the want of water. It is well known that the insectivora are more impatient of hunger and thirst than any other class of mammalia, dying if deprived of food and water for four or five hours. I believe, therefore, that this annual mortality must principally be referred to this cause, as during a wet season few, if any, dead shrews are to be found, and in many specimens I have dissected at this period I could find no trace of external or internal injury.

The male shrews, are, as is also the case with the mole, much more numerous than the females, and in the spring they seldom meet without fighting. Besides this species, another kind, the chestnut shrew (*Sorex castaneus*), is described by Mr. Jenyns. I believe it merely to be the common shrew in its summer fur, which at that period is light reddish brown, varying in shades in different individuals. Its winter and spring coat is longer and thicker, and is dark brown above, and grey beneath. In many specimens the tints vary, and I am inclined to think that both the so-called *Sorex castaneus* and *hibernicus*, to be merely specimens deviating slightly from the ordinary tint. Two species of shrew have been discovered in a mummied state in the catacombs of Thebes and Memphis. Of these, one is the *Sorex giganteus* of Isidore Geoffroy ; the other is a small species, termed *Sorex religiosus* by the same author. Of this species several well-preserved specimens existed in M. Passalaqua's collection of Egyptian antiquities in Paris. A shrew, probably this species, was especially held sacred in the athrilitic district of ancient Egypt.

The water shrew (*Crossopus fodiens*) closely resembles the common species in form, the snout being lengthened in the same manner, and the fur having the same velvety softness of texture. In size, however, it is superior—a full-grown specimen measuring more than five inches in length, while the common shrew rarely exceeds four. The colour above is principally deep glossy black, and pure white on the sides and under parts, the line of demarcation being very distinctly defined. There is also a small tuft of white hairs at the opening of the ear. The water-shrew, as its name implies, is usually found in the vicinity of pools and rivulets, forming in the banks long and winding burrows, which penetrate for a considerable distance into the soil, and end in a small chamber furnished with a bed of moss and dry grass. In this secluded retreat the young are born about the beginning of May, there being commonly from six to ten in the litter. When first born, they are curious pinky-white little animals, with round blunt noses and semi-transparent bodies, bearing as little resemblance as possible to their parents. A small colony of these shrews frequently inhabit the same spot, and towards the cool of the evening may be observed searching for food and sporting with each other in the water—now hiding behind stones or large leaves, to elude their companions, and then darting out to engage in a general skirmishing chase, diving and swimming with the greatest activity. By constantly traversing the same ground, in entering and returning from their burrows, they gradually tread down a path among the grass and herbage, by means of which their presence may be readily discovered. When under water, their fur is covered by multitudes of tiny air-bubbles, that shine like silver, and have a beautiful effect when seen in contrast to the dark surface of the body. Spots where the stream, in some bend of its course, forms a small pool, are the favourite resorts of this pretty little creature ; and though easily startled by the slightest noise, their range of vision seems to be far from extensive, as, by approaching as quietly as possible, I have often succeeded in watching their gambols without causing alarm among the community. The food of the water-shrew includes insects, worms, frogs, and small fish, which latter it pursues and captures with all the grace and agility of the otter. I am enabled to speak with certainty as to this fact, having kept a pair in confinement myself, and the account of whose habits I hope will not prove uninteresting. The cage I kept them in was made of wire, being twelve inches in height by eighteen in length, a zinc tank for water being adapted to hook on to the doorway. The shrews made themselves quite at home in their new quarters, feeding freely on worms, raw meat, and insects. When minnows were placed in their bath, they instantly plunged into the water, and seized the fish with great eagerness. I remarked that, while feeding, they held the fish firmly between their fore-paws, and commencing at the head, ate gradually downwards. They frequently ate three or four minnows each in a day. Your correspondent "Nooe," in a former number of *Land and Water*, remarked that many of his young trout had been killed by them, and a more destructive little beast to small fish than the water-shrew could scarcely be found. When running about their cage, these shrews often uttered a shrill sibilant chirp, resembling the note of the grasshopper lark. They would also play with each other in the water, rearing half up, and striking with the fore-paws, or rolling over each other on the surface.

Besides the water-shrew, another species, the oared shrew (*Crossopus remifer*) is found in Britain. For some time this animal was confounded with the water-shrew, as its habits are similar, and it frequents the same situations. It differs, however, in colour, the black on the back and sides being flecked with white hairs, the throat and abdomen blackish grey tinged with yellow; though scarcer than the other two kinds, the oared shrew is more abundant than is often supposed by naturalists, as I have several times taken it in different part of Hertfordshire and Surrey. I must here notice that the ears of both the oared and water-shrews are furnished with a peculiar and beautifully-contrived apparatus, by which the water is excluded from those organs; it consists of three small valves, which fold together when the animal dives, effectually preventing the entrance of a single drop of moisture. As soon, however, as the pressure is removed on the shrew rising to the surface they re-open spontaneously. Without this provision of nature, the animal would constantly be annoyed by the water filling the cavities, and irritating the delicate membranes of the ears.—N. L. Austen, F.R.S., *Land and Water*.

THE DECIDUOUS CYPRESS.

ALL trees have an individual character of their own. Some have it so marked that they impart a character to the whole scenery in which they occur, but few have it in such a degree or of such an impressive nature as the Deciduous Cypress. The gloomy brakes in which it stands up to the "knees" in water combine with it to make a scene of desolation and awe overpowering to the human mind. We remember a collector who went out to Brazil, and was exceptionally unsuccessful. The forests which yielded so much to others seemed to yield nothing to him. It was a puzzle at the time, but long afterwards (long after the poor man was in his grave) we learned the cause from one who had met him in Brazil. He could not stand the Brazilian forests. There was nothing in them to harm him, and he knew it, but they frightened him; their awful silence, dim obscurity, and impressive height took possession of his soul, and filled it with fear and trembling. With a companion he did well enough, but alone they scared him. If that is the impression left by the Brazilian forests, we may guess how much more the gloomy Cyprières, with their alligators, and countless creeping and slimy accessories (imaginary or not) must weigh upon the spirits. To form an idea of these regions we are told we must visit the spot itself; we may imagine but we cannot realise their oppressive silence, their awful lonesomeness, and their dreary aspect. Animated Nature is banished, life itself seems dead, until the sullen splash of the alligator wakens the echoes through the long canals, arched over like lofty aisles by the gloomy canopy of thick boughs of the Cypress. Not that natural beauty is wholly wanting: "The varied windings and intricate bendings of the lakes," says Darby, "relieve the sameness, whilst the rich green of the luxuriant growth of forest trees, the long line of woods melting into the distant sky, the multifarous tints of the Willow, Cotton, and other fluviatic trees, rendered venerable by the long train of waving moss, amaze the fancy."—Darby's "Louisiana," p. 69.

One not unfrequent incident in the life of the Swamp Cypress is its growing on floating islands in the creeks connected with the Mississippi, and by its long roots anchoring them and converting them in time into stationary land. "One of my fellow passengers," says Sir C. Lyell (Second Visit, ii., p. 186), "urged me to visit Lake Solitude, 'because,' said he, 'there is a floating island in it, well wooded, on which a friend of mine once landed from a canoe, when to his surprise it began to sink with his weight. In great alarm he climbed a Cypress tree, which also began immediately to go down with him as fast as he ascended. He mounted higher and higher into its boughs, until at length it ceased to subside, and looking round he saw in every direction, for a distance of 50 yards, the whole wood in motion. On inquiry Sir Charles learned the explanation of this marvellous tale. It appears that there is always a bayou or channel connecting during floods each deserted bend or lake with the main river, through which large floating logs may pass. These often forms rafts and become covered with soil supporting shrubs and trees. At first such green islands are blown down from one part of the lake to another by the winds; but the deciduous Cypress, if it springs up in such a soil, sends down strong roots, many feet or yards long, so as to cast anchor in the muddy bottom, rendering the island stationary."

It is to such a locality as this that M. Bossu refers when one day he had the misfortune to see his boat hemmed in by the branches of a tree that was set under water; he was benighted in this disagreeable situation, and obliged to wait for the break of day. But as this river rises and falls by the floods, he found himself quite in the air in his boat. They were 25 leagues from the mouth of the river, but the Mobilian savages that accompanied him comforted him by the hope that the next tide would set him afloat again, and really the tide mounting up the river from Mobile Bay delivered him from his disagreeable situation (Bossu's "Travels through Louisiana," p. 227, 1781.)

Mr. Darby's description of the great raft, 10 miles in length, which choked the Atchafalaya, gives us a more pleasing idea of such an island than we should have expected :—"In the fall season," says he, "when the waters are low, the surface of the raft is perfectly covered by the most beautiful flora, whose varied dyes, and the hum of the honey bee, seen in thousands, compensate to the traveller for the deep silence and lonely appearance of Nature at this remote spot. The smooth surface of that part of the river unoccupied by the raft, many species of papilionaceous flowers, and the recent growth of Willow and Cotton trees, relieves the sameness of the picture. Even the alligator, otherwise the most loathsome and disgusting of animated beings, serves to increase the impressive solemnity of the scene."

But it must not be supposed that in all these Cyprières the ground is perpetually a swamp; some are, but many are so only for a portion of the year. Darby tells us that "the lands that are inundated by the spring freshes in the low lands of the Atchafalaya remain almost entirely devoid of water on the retiring of the floods. No portion of wood-land in America is more completely without water in the fall season than this. Miles in succession of those regions that we have in former times consigned to eternal submersion, are, in fact, eight months of the year almost totally deprived of water for the ordinary necessities of animal existence. This observation will be found circumstantially correct in all the range that divides the delta from the prairies, or heights, to eight or ten miles distant from either." At the other season all is changed, and one universal inundation covers everything. From the mouth of the Courtableau to the head of the Cow Island, the breadth of the overflow between the Atchafalaya, Opelousas, and Allacapas is about eight miles wide. This space is an immense lake for many months; the currents of the smaller bayous are lost in the maze, and only remain distinguishable by the openings of their channels. The many lakes that mingle with the outlets of the river, and with each other, render this region most inconceivably intricate. It is with the utmost difficulty that the real channel of even the river can be distinguished from the number of outlets and inlets that wind in every direction.—A. M.—*Gardeners' Chronicle*, March 2.

INSECTS IN AUSTRALIA.

THE entomologist would reap a rich harvest of delight in Australia. The whole ground, and much of the vegetation, in summer, are literally alive with insects of very great variety, differing in different places, affording another remarkable contrast to New Zealand, where there are very few insects, and where one may lie on the ground with as little fear of them as he would on his bed. There are great numbers and varieties of centipedes. The tarantulus, a poisonous spider, and the scorpion, have no doubt some great purpose in the economy of creation here, and are useful in their place. The greatest amount of harm the insects would seem to do is to create an uneasy feeling whilst resting one's-self on the ground, which it is almost impossible to do without the knowledge of the certainty of smothering hundreds of them. The centipede, however, is quite able to resent an injury of this kind. In lifting firewood, fear is always entertained of some poisonous insect.

Ants are spread all over the surface, and they live as if they claimed to be the sole and rightful owners of the soil. The branches of the highest trees are not exempt from their excursions and marauding expeditions. There are many varieties of them, one of which, the Soldier Ant, about an inch in length, will stand up on its hind legs, and in this threatening attitude face a man on horseback as if disputing the right of way. They have settlements all over the bush, with paths leading to them, beaten hard and plain like a great public highway. Some of these settlements are very conspicuous objects, and the stranger is sadly puzzled in endeavouring to guess what they are—assuming, as they do, the shape of conical shaped mounds of red earth occurring at intervals, some of which are as large as small haycocks; these are called ant-hills. There are also ant-beds of greater or less size, all teeming with life, and not much elevated above the level of the ground. There is a species which is provided with wings at a certain period, said to be females. The wings drop off after they have flown about for a short time, and the ground seems strewn with them. The ants are proverbial for their untiring labour and industry, and their thoroughfares through the bush are crowded with them, going to and fro, from the early dawn of the morning till late in the evening, those returning to the settlements carrying spoil of some kind or other. In the manna country and season, they appear as if conveying bags of flour on their backs. They are the great bush scavengers, and make prey of all the dead animal matter and all the insects which they can get hold of. Great numbers of them may be often observed engaged in a conflict with a live butterfly or beetle, which they are careful at first sight to denude of the wings. Unable to draw it along whole, it is cut or sliced into small pieces, to admit of easy and speedy carriage. The law of co-operation seems to be well understood by them, help being always rendered where help is required; and if one of them is unfortunate in laying hold of too large a piece for carrying, there are always plenty ready to give a helping hand. They have evidently some means of communicating information to one another—a language of signs—and they may be frequently observed on their journeys to put their heads close together, as if receiving and imparting intelligence. The very diminutive black ants are the most troublesome. They have settlements under ground, and come out in myriads when the scouts have discovered some delectable stuff, such as honey or sugar, in any part of a house. They are always seen in a line, like a train of gunpowder, following one after the other, passing and repassing. Every conceivable expedient is resorted to for keeping sugar, preserves, and other sweets, out of their reach. The white ant would seem to be one of the principal agents in earth-making in Australia, causing the trees to supply a vegetable mould from the trunks and branches which is not done with the leaves: in fact, they may be very serviceable in this way, as they will make a heap of dirt in a very short time. It is not so agreeable, however, when they effect a lodgment in the pine flooring and the other timber of a finely painted and furnished dwelling-house.

There is a great abundance and variety of spiders, butterflies, beetles, and moths, and some of the last are very large and beautiful. Every one complains of the common house fly being far too plentiful in summer, and a very great annoyance; the March-fly, the same as the gad-fly, is very tormenting to horses and cattle; the blow-fly occasions immense anxiety, and though a great foe to strivers after domestic economy, is a great friend of hungry dogs. It is remarkable that sheep never seem to suffer from it, not even when newly shorn, and when the Australian sheep-shearers appear almost indifferent as to shearing the skin off with the wool. No doubt the great dryness of the climate will account for this.

Mosquitoes, from the bites of which new-comers complain so much, are not much known in the interior; sandy, bushy, low-lying parts of the country, where there is water, being their favourite place of resort. It is only when first bitten that their bites are attended by very disagreeable eruptions upon the hands and face. The sand-fly in New Zealand is almost as annoying, but neither of them are much worse than midges. There is a large fly called a locust, which comes out of the ground in summer, leaving its grave cerements generally at the grave's mouth. In some districts the trees are completely covered with them, and they make a most deafening noise.

There are none of the flying insects so much deserving notice as the bees. The native bee has no sting, is dark in colour, slender in body, and not much larger than the common house-fly. The aborigines adopt a very ingenious method of discovering their hives: catching one, which they can always readily do where there is water, they fix with gum, which is easily obtained from any of the trees beside them, a small particle of white down upon its back, let it fly away, and keep running after, holding their eyes intently upon it, till they see it alight at its hive, which is always found in a hole in an upstanding tree. One native, with a tomahawk or stone adze in hand, cuts notches in the trees for his big toes to rest upon, and in this way, making notches as he ascends, using them as steps in a ladder, and holding by the tree with one of his hands, he mounts, and very speedily cuts out the honey-comb at the place where the bee was seen to enter. The bark from the knot of a tree serves for a dish to hold the comb, and it is soon devoured at one meal. Hives of English bees were regarded, until a comparatively recent period, as great curiosities. It is most surprising how fast these bees have multiplied here, and how rapidly they have spread. Farther and farther every year they are found making their way into the interior, to the great delight of many who had not anticipated the arrival of such welcome visitants. With the countless numbers of milch kine and the honey lodged in the trees, it almost ceases to be a figurative expression to say of Australia that it is a land flowing with milk and honey. There are none who have benefitted so much from the introducrion of English bees as the shepherds and their families. Out all day with their flocks of sheep, and straggling after them amongst the trees, it is a pleasant recreation and a profitable way of spending their superabundance of spare time, to look for the treasures of honey. There was one hut which I entered where the man employed as hut-keeper had been very industrious in laying up a large store of it in casks for sale. The atmosphere in some quarters is strongly impregnated at a certain season with the smell of honey, and this is the case especially where a heath, much resembling the Scottish heather, abounds. The mamosa tree is one mass of sweet-scented golden blossoms and sprigs, and there are other flower-bearing trees of a larger kind, furnishing no end of pasturage for bees. The climate would also appear to be highly favourable to their increase and spreading. There are many of the trees hollow in consequence of the destruction effected by the white ant, and these hollow upstanding trees are as excellent places of shelter for bees as they are for opossums.—*Australia as it is.* Longmans.

PIPE FISHES.

THERE is a small group of fishes which are called, from their structure, Pipe, or Bill Fishes. They are among the oddest of the finny race and are well worth a careful examination. Fortunately, they are very plentiful, so that there is no difficulty in obtaining specimens for investigation.

In this group there exist so many peculiarities that it is difficult to describe them in their proper order. We will, however, begin with the structure from which they derive their name. They are among fish what the snipe and woodcock are to birds, their jaws being greatly lengthened and attenuated. But they differ from the snipe in the fact that the jaws are united throughout their whole length, and have but a very small mouth at the extremity. The structure of the jaws and mouth is almost exactly similar to that which is found in the Echidna, or Spiny Anteater of Australia, and it is impossible to compare the two creatures together without seeing that the same principle has been carried out in a denizen of the land and a dweller in the water.

The gills of the Pipe Fish are not in the least like those of the fishes which have been already described, and which are familiar to us by means of the fishmongers' shops. Instead of the scarlet fringes which deck the branchial arches, the Pipe Fishes have a number of little round tufts set closely together.

The body is long and snake-like, and in one species, which is scarce, and not likely to be taken near the shore, the body is not thicker than a goose quill, though a foot or fourteen inches in length, and tapers away almost to nothing at the tail. The end of the tail is prehensile, and is used exactly as are the tails of the various prehensile mammalia. These animals inhabit trees, and use their tails as a means whereby they can suspend themselves from the branches, or more firmly maintain their position, whereas the Pipe Fishes use them in order to grasp the seaweed and anchor themselves in safety while the restless tide is passing by them.

Pipe Fishes are very interesting inhabitants of an aquarium. They are restless, inquisitive beings, poking their long snouts into every crevice, and assuming the most extraordinary attitudes. Sometimes four or five of them will be seen quite perpendicular in the water, all having their tails twisted round the same object, and all holding their odd little mouths close to the surface, as if to capture any small insect that might be unfortunate enough to fall into the water. Sometimes they will assume a perpendicular attitude, but in just the opposite direction, their tails being near the surface and their mouths at the bottom of the aquarium.

These curious positions are maintained by means of the dorsal fin, *i.e.*, that fin which runs along a portion of the back, and which is in itself a really wonderful piece of mechanism. Practically, it is a screw propeller, which undulates instead of revolving, and which causes the fish to advance or recede in precisely the same manner as the undulations of a snake in the water enable it to swim. If any of my readers are experienced in boating, they will understand this movement better by comparing it with the familiar method of propelling a boat by working backwards and forwards an oar passed over the stern. Even the rudder of a boat will act as a screw propeller, if worked steadily backwards and forwards.

The undulations of the dorsal fin are so rapid, that a somewhat quick eye is needed to discern them, or even to see the fin at all, which seems to disappear like magic, and which can only be detected by the reflection of light from the successive waves that ripple over the fin. The fin itself is exceedingly thin and delicate, and when the fish is taken out of the water the fin collapses so completely that it is scarcely recognisable.

Another of the oddities of the Pipe Fish is the method by which its body is protected. Instead of being covered with scales, as is the case with the generality of fishes, it is armed with a number of hard flat plates, rather variable in number according to the particular species. The reader will remember that a somewhat similar armature is found in the sticklebacks.

But by far the most curious portion of the Pipe Fish's economy is the pouch in which the eggs are hatched, and in which the young are sheltered for some time after they have left the egg. We are familiar with a terrestrial example in the kangaroo, and all the marsupial tribe, and would naturally expect that certain inhabitants of the waters might be furnished with a similar apparatus. In the Pipe Fish, however, the pouch belongs, not to the female, but to the male fish, and, in consequence, was the cause of sore perplexity to those who first investigated it. The pouch is composed of two long flaps of skin, which run from the tail along the under side of the body, and are several inches in length. Between these flaps the eggs are deposited. There they are preserved from the merciless jaws of other fish, until they are large enough to encounter with safety the dangers of the seas.

Mr. Yarrell mentions that the fisherman told him of a curious fact with regard to the Pipe Fish. If they take a Pipe Fish, open the pouch, and shake the young into the sea, the little creatures do not swim away, but hover about the spot, as if waiting for their parent. Then, if they hold the fish in the water, the young will swim to it, and immediately re-enter the pouch. Some young that were found in the pouch of a male fish by the above-mentioned author measured rather more than an inch in length.—Rev. J. G. Wood in *Routledge's Magazine for Boys*, March.

METEOROLOGY AND THE GARDEN.

THERE are five plants which have been observed from time immemorial for the signs of the weather. The dandelion, the trefoil, the pimpernel, chickweed, and the Siberian sowthistle.

The dandelion is a very common plant, which flowers early, and remain in bloom more or less all the year. The general flowering, however, takes place about the 8th of April, and for a month it bespangles the fields, mixing agreeably with the daisy. The down of the dandelion closes for bad weather, but expands for the return of sunshine; the down of other plants may be observed for the same indications.

The trefoil, according to the observations of the great Lord Bacon, grows more upright with a swelling stalk against rainy weather, and the same may be said of the stalks of most other plants, though not so conspiciously as in the trefoil. Before showers the trefoil contracts its leaves, as does the convolvulous and many other plants.

The pimpernel is the *anagallis arvensis* of Linnæus, and is found in our stubble fields and in gardens flowering in June, and continuing all the summer. When this plant is seen in the morning with its little red flowers widely extended, we may generally expect a fine day; on the contrary when the petals are closed rain will soon follow. This is the plant which Lord Bacon seems to refer to under the name of *windcope*, and which has also been styled *the poor man's weather glass*.

Chickweed is said to be an excellent weather guide. When the flower expands freely no rain will fall for many hours. If it so continue open no rain for a long time need be feared. In showery days the flower appears half concealed, and this state may be regarded as indicative of showery weather. When it is entirely shut we may expect a rainy day.

If the flowers of the Siberian sowthistle remain open all night we may expect rain next day.

We have no doubt that if the subject were systematically studied in daily observation almost every plant would be found to indicate more or less conspicuously all coming changes of the weather; and so it is obvious that a new charm or interest might be given to our gardens, an examination or passing inspection of which in the morning before leaving for town would lead us to infer whether "we had better take an umbrella or not;" a matter of frequent doubt in our changeable climate.

Besides being natural meteorological instruments, plants have also shown themselves capable of serving as clocks and watches. The term Flora's clock has been applied to this curious phenomenon denoting the periodical opening of flowers, whereby the hours of the day are indicated.

As the opening of flowers depends upon temperature, the main fact need not surprise us; but it is very curious to discover that the degree of temperature required in every case is so accurately measured by nature as to take place at fixed periods of the twenty-four hours.

Accordingly we find that the flowers of one country do not open at the same time as in others. Thus an African plant which opens at 6 o'clock, if removed to France will not open till 9, nor in Sweeden till 10, that is until it gets the requisite temperature; those which do not open in Africa till noon do not open at all in Europe, because of course their requisite temperature is never attained.

The goat's beard opens at sunrise and closes at 10. The garden lettuce opens at 7 and shuts at 10. The yellow star of Jerusalem (*Tragopogon pratensis*) and the purple star of Jerusalem (*T. porripolius*) close their flowers exactly at noon. The mouse ear closes at ½ past 2. The cat's ear closes at 3. The princes-leaf, or four o'clock, opens at 4. The evening primrose (*Ænothera biennis*) opens at sunset, and closes at daybreak; it opens with a snapping noise.

A species of serpentine aloes without prickles, whose large and beautiful flowers exhale a strong odour of the vanilla during the time of its expansion, is or was cultivated in the Imperial Gardens at Paris. It does not blow till towards the month of July, and about 5 o'clock in the evening, at which time it gradually open its petals, expands them, droops and dies; by ten o'clock the same night it is totally withered, to the great astonishment of the spectators. The cerea, a native of Jamaica and Vera Cruz, expands a beautiful coral flower, emitting a fragrant odour for a few hours in the night, and then closes to open no more. The flower is nearly a foot in diameter, the inside of the calypse of a splendid yellow, and the petals of a pure white. It begins to open about 7 or 8 o'clock in the evening, and closes before sunrise in the morning.

The dandelion must be mentioned again, it opens in summer at half-past five in the morning, and collects its petals towards the centre about 9 o'clock. It also possesses the very peculiar means of sheltering itself from the extreme heat of the sun, as it closes whenever the heat becomes excessive.

Such are a few of the most remarkable horary flowers; but no doubt most flowers are more or less "particular" in their hours of opening, depending as the fact does on the requisite temperature, and therefore such observations may be turned to meteorological account in connection with the daily temperature and the seasons.

Other conditions, however, besides temperature are required for the time of blooming; and of all the propensities of plants none seem at first more unaccountable than the different seasons in which their blossoms appear. Some produce their flowers in winter, as the Christmas Rose; others in February, as the elegant snowdrop; in March the crocus; in April the sweet-scented violet peeping through the thorn; in May the cowslip perfumes our meads; and June is crowned with all the varieties of the unrivalled rose. Thus throughout the varying year, till after most plants have formed their seeds, fade, and decay, appears the beautiful leafless flower, the winter crocus. This common circumstance is amongst the wonders of creation, and it would perhaps be as difficult satisfactorily to explain it as the most rare or stupendous phenomena of nature.—*Andrew Steinmetz's Sunshine and Showers.* London: Reeve and Co.

WILD BEES.

THERE is no genus of wild bees so generally known, in this country, as that of Bombus: it contains the humble bees, known to us even in childhood; the schoolboy is familiar with them, and but too frequently ruthlessly robs them of their stores; the artless rhyme that he lisped in childhood taught him that the bee "gathers honey all the day from every opening flower," and he fails not to avail himself of that knowledge.

The Bombi are among the first bees that are tempted forth from their winter hybernaculum, and those that first appear are the females that were reared in the nests of the previous year, and which have just awoke from the state of torpidity in which they have passed the winter months; their hum is one of the most joyous notes that greet us in early spring. Humble bees are to be found almost everywhere: they are seen in every sunny nook, they are on the hills, they are in the valleys; and if we are tempted to wander over trackless moors, far from the haunts of man, these bees are there also.

There are no bees that have a wider geographical range: nineteen species inhabit this country, and nineteen additional ones are found in other parts of Europe; eighteen are known from North America and the regions within the arctic circle; India, China, and the islands of the Eastern Archipelago, have at present furnished twenty species, and many more no doubt will be discovered in the northern parts of the great continent; but in Australia, New Zealand, and Africa the Bombi are not found, if we except two or three European species that have been observed to penetrate the north of the latter country: as yet only five or six species have been discovered in the new world, but the above enumeration will show how widely they are distributed.

Of the species found in this country the majority are generally distributed, but a few are extremely local, being confined either to the mountainous or extreme parts of the north, two species having hitherto been found in Shetland only.

During a series of fine, hot, and dry summers, these bees multiply in great numbers, whilst a succession of cold and wet seasons reduces them; indeed, so greatly were those species that build their nests on the surface of the ground reduced by the continued rains of the summers of 1859-60, that at this time they have by no means regained their usual maximum of abundance.

Their numbers are also greatly reduced by various enemies, and parasites of their own order : field-mice and weazels are said to devour the contents of their nests ; such a circumstance has not, however, fallen under my notice. Of insect-parasites various species of Diptera are the most destructive to our native species : some nests are infested by species of Volucella, which destroy a considerable portion of the larvæ. A fossorial insect, Mutilla Europea, is occasionally found, in the larva state, feeding on the young brood of these bees : M. Drewsen reared from a nest of Bombus Scrimshiranus, taken near Copenhagen, no less than seventy-six of this Mutilla ; the parasite is, however, too rare in this country to cause any great diminution of their numbers. Acari occasionally render their nests almost untenantable by their numbers ; they devour the honey and wax. I have also frequently found Coleoptera in nests, but not in such numbers as to render it at all probable that they cause any great destruction of the inhabitants ; Anobium panicium, Antherophagus nigricornis, and one or two species of Brachelytra, are among the number.

The nests of the Bombi are constructed either on the surface or under ground : such is the normal habit of the species, but numerous departures from their normal habits have been observed. One or two species frequently construct nests under stones, in crevices of rocks, and in other situations adapted to their purpose ; others avail themselves of the nests of birds ; and I have observed one instance in which Bombus senilis had taken posession of the nest of a fieldmouse, and I am inclined to believe this to be a not unfrequent occurrence. I have recorded one instance of Bombus Pratorum having taken possession of the nest of a robin, built in the porch of the cottage of my friend Dr. Bell at Putney ; and Bombus Muscorum was observed entering the nest of a wren at Holmbush, near Brighton : the eggs of the wren were embedded among the waxen cells of the bee. A lady of my acquaintance, some years ago, observed Bombus Muscorum collecting horsehair in the latticed window of a stable, and, by watching her when conveying a load, discovered the nest, composed entirely of that material. These are a few instances sufficient to show that these bees, like those of other genera, as I shall have occasion to record, sometimes depart widely from the normal habit of their species.

Those species that build on the surface of the ground have received the popular cognomen of moss-builders, a term by no means appropriate, since, of the number of nests that I have examined, not more than one in a dozen has been constructed of that material. As well as my experience enables me to judge, the Bombus Derhamellus more frequently selects moss than any other species : this bee very frequently selects some cavity in a hedgerow-bank where moss is growing, and under such circumstances chooses that material ; but in Yorkshire, where the species is much more numerous than in the South, its nests are of very frequent occurrence in hay fields, and in such situations they are principally constructed of blades of grass and small leaves of various plants, &c. The nests of Bombus Sylvarum are also usually composed of grass and the fibres of plants.

The name carder-bees has also been applied to the surface-builders : they are said to comb or card the moss used in constructing their nests. A very interesting account of their proceedings is given by Réaumur ; Kirby has given the same history of them, and Shuckard has repeated the account in his recent work on the "British Bees." A representation of a number of humble bees at work will be found in Réaumur's "Mémoires." The account is in substance as follows :—"A worker bee takes a small portion of moss, and with its maxillæ and fore legs proceeds to card and comb it ; when the pieces are sufficiently disentangled they are placed under the body by the first pair of legs, the intermediate pair receive them and deliver them to the last, which push them as far as possible beyond the anus. When, by this process, the insect has formed behind it a small mass of moss well carded, either the same or another insect, who takes her turn in the business, pushes it nearer to the nest. Thus small heaps of prepared moss are conveyed to its foot, and in a similar manner they are conveyed to its summit or wherever they are most wanted. A file of four or five insects is occupied at the same time in this employment."

The entrance to the nest is also described as being through "a long gallery or covered way, sometimes a foot or more in length." Although I have on several occasions observed these bees at work, I never detected this co-operative process of building : I watched a nest of Bombus Sylvarum last summer, and saw working bees dragging pieces of grass towards the nest, but each bee worked alone ; and some years ago I saw a colony of Bombus senilis, in which three or four working bees were dragging pieces of moss on to the nest, not, as described by Shuckard, in the form of pellets, but simply sprigs of moss, which the bees had apparently just cut off, close to the nest. Neither have I ever been able to detect the covered ways; probably these are only occasionally constructed: all the nests that I have examined had entrances at the basal margin of the nest. Réaumur found nests with the "interior surface or roof cased or sealed with a kind of coarse wax, in order to keep out the wet:" this is a process that none of the nests that I have taken had undergone; I have in wet seasons found nests containing a mass of comb covered with mould, all the grubs having perished, and apparently the entire community had shared the same fate.—Frederick Smith, in the *Entomologist*, March.

MARINE SAURIANS.

THE Ichthyosaur, Teleosaur, Pliosaur, and Plesiosaur, were the most terrible and monstrous creatures that ever inhabited the "vast oceans" of earth; and although great and abundant monarchs of a world of water, they were still but a "powerful few" amongst the numerous families of reptiles whose aquatic habits have caused the lias formation to be so rich with their fossil remains. The teleosaur resembled the modern crocodile, and was more abundant during succeeding ages. These various genera of marine monsters were all of huge proportions. Those of the ichthyosauria tribe were upwards of fifteen yards in length, their eyes were usually about ten inches in diameter, and their huge lizard-like heads and crocodilian teeth contrasted strangely with their long fish-like bodies and short intervening necks. The bodies of the ichthyosauri and pliosauri seem to have been attached directly to the head, without the intervention of anything that could be called a neck. Their fins, or paddles, were admirably adapted to their habits, being of enormous dimensions, although in proportion to their bodies, and of herculanean strength. With one stroke of their mighty fins they could shoot along through the deep with incredible velocity, and overtake, kill, and devour the largest and most powerful sharks, in consequence of their greater strength and activity. The ichthyosaur was truly a most ferocious and predacious creature, and its structure was such as to lead us to conclude that a regular periodical or intermittent ascent to the surface for the purpose of breathing air was necessary to an existence.

Prowling about far below the surface, says the learned Professor Ansted, but with an eye glaring upwards like a large globe of fire, the ichthyosaur may be supposed to distinguish the work going on above, and watch the plesiosaur in its search after prey. Suddenly, and with one stroke of its powerful fore paddles, and the powerful action of its huge tail-fin, it rises to the surface with the velocity of lightning. Its vast mouth, lined with formidable rows of teeth, opens wide to the full extent; it overtakes the object of its attack, and with a motion quicker than thought the jaws close, and perhaps some plesiosaur falls a prey. Not always, however, would it fall a resistless prey, or die unrevenged; for there can be little doubt, that with the advantage of position, the stroke of the head of this slight but active reptile might occasionally reverse the picture, and insure victory to the less powerful of the combatants.

The plesiosaur was a very formidable creature, usually from eight to twelve yards in length, whose fins, or paddles, were like those of a whale, and its teeth similar to those of a crocodile. It was, of course, an air-breathing animal. It had the head of a lizard, and a flexible neck of enormous length, arched like that of a swan, and somewhat like the body of a serpent, which, as it generally swam at the surface of the waters, it thrust downwards or upwards to seize the fishes or birds that might happen to come within its reach. This monstrous creature was one of the most voracious, predacious, and formidable animals that ever existed within the wide precincts of our globe. It was, truly, the tyrant of the deep—of the more shallow seas in particular—during the days of its existence, and well was it for its contemporaries that its increase was checked, and its numbers kept within bounds by the deadly ravages of the still more ferocious ichthyosaur, who, it seems, had a strange feeling of delight in feeding on the body of its less powerful rival.

How strange must have been the plesiosaur's appearance on the waters as it paddled rapidly along, raising betimes its strange, wedge-shaped head high in the air, then plunging into the deep, and then, with an inconceivable velocity, darting to and fro on the waters like the fabled sea-serpent, pursuing, seizing, and devouring its prey, or perhaps occasionally seeking shelter from the deadly jaws of the monstrous ichthyosaur. When attacked in the deeper seas, it fled to the shallow waters near shore (as it could swim on the surface, and was exceedingly brave and active), it had the advantage of its colossal foe, and generally compelled him to beat a hasty retreat.—*Victor le Vaux's Twin Records of Creation.*

THE AMAZON.

THE whole extent of the area of the valley is covered by forests, and is not, like other plains under the tropics, partly desert and partly covered by vegetation. The whole of the Amazon valley is covered with luxurious vegetation, and this vegetation is sometimes so dense that it is almost impenetrable, and of its characteristics in this respect, he would give some account. The river Amazon runs through three different regions, each presenting a different aspect and characteristics from one another. In the lower part of its course two tributaries join the Amazon —one of them rising in the high table land of Guayana, the Rio Negro on the northern shore, and which latter has its source in the mountains of Bolivia. These tributaries are of great dimensions, and the whole basin of the Amazon is full after having received their waters. It is from the junction of these rivers that the great river itself receives its name, and from thence extends to the Atlantic Ocean. That part of the Amazon which occupies the middle tract of the continent is called Solemock. The southern shore of the Amazon, below its junction with the Madeira, receives other rivers, three of which flow from the southern slope of the table land of Brazil. To the east of the Rio Negro there are a number of other rivers flowing into the Amazon, hardly known among us by name, and yet of very great importance, and remarkable for their peculiar character. There are among those tributaries four rivers so broad that we have hardly any river so broad, though their courses are not very long. These at their mouths are over thirty miles wide, and some of them over sixty miles wide. Following the southern shore of the Amazon to its mouth, you behold an entrance so wide, that it is as if the wide ocean were spreading before you, and you were passing from a river to the open sea. These rivers are comparatively shallow, and their current is very light: the natural consequence is that they carry little material in suspension, and their waters are therefore clear and transparent, but somewhat tinged by vegetable substances to a greenish hue. Others of these waters are tinged with gray, and others again are yellowish. The river Madeira is totally different in its character from those. It is a very deep river, flowing rapidly, and carrying with it a large amount of loose material, giving the water a whitish colour, from which circumstance the Madeira is called "White Water River." There are three tributaries called "White Water River," but they differ materially from the Madeira, though, like it, very deep. They are very tortuous and meandering, and destitute of islands, while the Madeira has numerous islands. The consequence is, these rivers can be navigated to a distance of five hundred miles by large vessels drawing fifteen or eighteen feet, with as much ease as they could in the main stream of the Amazon. The Rio Negro presents a very different aspect; it is very wide, but less deep, and has a very slow course, and is dark and transparent, owing to the large amount of vegetable matter held in solution in the water, and when seen from above it looks as dark as ink. Therefore, not only in the width, and depth, and bulk of water, but also in the characteristics of the water, every region of the Amazon has its peculiar character. The Amazon, as a whole, is a white water river. The mouth of the Amazon, where it enters the Atlantic, is one hundred and fifty miles wide. It is the widest, largest, and of the greatest volume of all known rivers. The lecturer then proceeded to give a brief description of the productions of the region of the Amazon, enumerating the costly dye-woods, medicinal plants, and the valuable timber which grows in great abundance in the valley, and which at present forms but a small and meagre source of traffic. The liberal policy of the Emperor of Brazil would, however, change all this, and he expected ere long to see the whole country of the Amazon and the Andes opened by the enterprise of the American people.—*From a Lecture delivered by Professor Agassiz, at the Cooper Institute, New York*, Feb. 18, 1867.

New Roses for 1867

Hybrid Perpetuals. Alba Carnea (*Touvais*), white, lightly tinged with rose, the under side of the petals pure white, the flowers are of medium size and beautifully formed, habit moderately vigorous. Antoine Ducher (*Ducher*), brilliant red, very large, double, and superbly formed, robust and vigorous habit: a seedling from Madame Domage. Charles Verdier (*Guillot père*), fine rose colour, with whitish edges, very large, very double, and well formed, habit very vigorous: a seedling from the esteemed variety Victor Verdier. Comte Litta (*E. Verdier*), brilliant velvety purple, edged with violet, growth vigorous, flowers large, full, and well formed, having large undulating petals. Comtesse Félicie Morguès (*Pernet*), brilliant rosy red, the centre petals edged with white, habit robust, flowers large and full: a seedling from Victor Verdier. Eugene Scribe (*Gautreau*), brilliant dazzling red, extra large, full, and well formed, growth very vigorous. Francoise Treyve (*Liabaud*), fine deep shining scarlet, quite a new colour, large and double, very vigorous grower. Gloire de Monplaisir (*Gounod*), lively red, large double, and of excellent form, habit very vigorous and free flowering. Horace Vernet (*Guillot fils*), velvety reddish purple, shaded with deep crimson, flowers of extra size, with very large petals, making a very effective appearance on the plant, a vigorous grower. Madame Anna Bugnet (*Gounod*), tinted white, changing to marble rose, large, full, and imbricated, a vigorous grower, producing large clusters of flowers. Madame Bellenden Ker (*Guillot père*), superb pure white, medium sized, fine, and double, of moderately vigorous habit. Madame George Paul (*E. Verdier*), brilliantly tinted and shaded rose, with whitish edges, large, full, fine imbricated form, vigorous and distinct. Madame Rival (*Gounod*), delicate, satin-like rose, large, double, and well shaped, habit very vigorous: a seedling from Auguste Mie. Madeleine Nonin (*Ducher*), rose, lightly tinged with salmon, medium sized and very double, flowers excellently formed, habit vigorous, a fine autumnal rose. Mademoiselle Annie Wood (*E. Verdier*), clear brilliant red, large, very full, and perfectly imbricated, habit very robust, a most distinct and remarkable rose. Mademoiselle Eleanor Grier (*E. Verdier*), deep rose, large, full, and of perfect form, fine robust habit. Mademoiselle Marie de la Villeboisnet (*Trouillard*), fine delicate rose, very large, very double, and slightly imbricated, good habit and vigorous grower. Mademoiselle Jeanne Marix (*Liabaud*), bright rose marbled with purple, very large, full, and cup shaped, a remarkably vigorous grower. Monsieur Chaix d'Est-Ange (*Leveque*), brilliant vermillion red, large, full, and excellently formed, a vigorous grower and profuse bloomer. Monsieur Noman (*Guillot père*), delicate rose colour, the edges of the petals being almost white, large and double, a good grower and abundant bloomer: a seedling from Jules Margottin. Monsieur Theirs (*Trouillard*), fine brilliant red, large and very double, the outer petals very regular, those towards the centre slightly incurved, good habit. Napoleon III. (*E. Verdier*), brilliant scarlet and deep violet, large and double, a very distinct and remarkably rich rose, fine robust habit. Paul Verdier (*C. Verdier*), magnificent bright rose colour, large, full, and perfectly imbricated form, vigorous habit, producing several fine flowers on a branch. Souvenir de Mons Roll (*Boyan*), fine reddish cerise, richly tinged or shaded, a large and beautifully formed rose, making a vigorous and very effective plant. Thorin (*Lacharme*), pure brilliant rose, large, full, and of excellent form, habit remarkably robust.—TEA SCENTED. Bouton d'Or (*Guillot fils*), superb deep yellow, reverse of petals white, medium sized double flowers, an excellent variety, with a fine style of growth. Isabella Sprunt (*Verschaffelt*), delicate yellow, lighter towards the edges of the petals, good habit, and very free. Madame Bremont (*Guillot fils*), fine reddish purple, varying to deep purple, large and double, vigorous habit and fine style of growth, very distinct. Madame Margottin (*Guillot fils*), fine deep citron yellow with rosy peach centre, the edges of the petals white, flowers of good size, very full, and rather globular; this is a most distinct variety, of vigorous and pleasing habit. Monsieur Furtado (*Laffay*), bright sulphur yellow, medium size, very double, and well formed, a hardy and vigorous grower.—BOURBON. Œillet Flamand (*Ogar*), brilliant rose, delicately striped with pure white, a medium sized compact and double flower, habit robust, quite a distinct variety.—*Floral World*, March.

NEW SPECIES OF PLESIOSAURUS.

A fine addition has recently been made, by purchase, to the remains of *Plesiosauri* in the British Museum. This specimen is from the Lower Lias, near Charmouth, and was obtained by E. C. H. Day, Esq., F.G.S., the fortunate discoverer, in the same locality, of the larger specimen of *Plesiosaurus rostratus*, described and figured by Professor Owen in the "Palæont. Soc. Mon." for 1865. The fossil has been skilfully developed from its matrix by Mr. Isaac Hunter, of Charmouth. The entire skeleton measures nearly fourteen feet in length, and has almost all the vertebræ in their natural sequence and position, a few only of the caudle series being displaced. The neck, which is slightly curved, is long, and gradually tapered to rather slender proportions at its connection with the head. A large portion of the cervical, and the whole of the dorsal vertebræ, with their spinous processes, and the ribs, have been partially cleared from the rock in which they were embedded; thus giving an upper and under view of the skeleton, which is placed in a frame, with its ventral surface towards the observer. A plaster cast of the dorsal region, which would otherwise have been hidden, has been made and fixed above the specimen, to show the continuity of the series of vertebræ, which are entire, having their lateral processes and neural spines attached; the ribs are also preserved. This ventral view shows well the very large, perfect, and strong sternal and pelvic bones, with their broad surfaces, for the attachment of the powerful muscles of the paddles; these are, however, imperfect, for, of the numerous bones of which they were composed, only the right humerus and femur, and portions of those of the left side are preserved. The head, which has lost the anterior portion of the muzzle, was, with a part of the neck, turned over when the animal was deposited in the mud of the Liassic sea, and is, therefore, seen from above. It is much larger in proportion than in *P. homalospondylus*, Ow., or *P. dolictrodeirus*, Conyb., but not so large as that of *P. rostratus*, Ow. The neck is much longer than that of the latter species. The present specimen has been named by Professor Owen, *Plesiosaurus laticeps*.—W. D., in the *Geological Magazine* for March.

AFRICAN VILLAGE.

The village of Mokaba is large and well arranged; its site, as I have before remarked, is picturesque, and, in short, it was the prettiest village I have ever seen in Africa. There are upwards of 130 houses or huts, which, as in other West-African villages, are so arranged as to form one main street. But, in Mokaba, several houses are connected so as to form a square, with a common yard or garden in the middle, in which grow magnificent palm trees. Behind the houses, too, are very frequently groups of plantain and lime trees. The village being thus composed of a series of small quadrangles and back gardens, containing trees with beautiful foliage, the whole effect is very charming. In the rear of the houses, amidst the plantain groves, they keep their goats, fowls, and pigs. This is the only village where I saw tame pigs. I was struck with the regularity of the main street; but, besides this, there was another narrower street on each side of the village, lying between the backs of the houses and the plantain groves, and kept very neat and closely weeded. Each house has in front a verandah, or little open space without wall, occupying half the length of the house; the other half, in equal portions on each side, forms apartments in which the owners sleep and keep their little property. When a man marries, he immediately builds a house for his new wife; and, as the family increases, other houses are built, the house of each wife being kept separate. The palm trees in the quadrangles are the property of the chief man of each group of houses; and, being valuable property, pass on his death to his heir, the next brother or the nephew, as in other tribes. Some of these palm trees tower up to a height of fifty feet, and have a singular appearance in the palm-wine season from being hung, beneath the crown, with hollowed gourds receiving the precious liquor.

The large quantity of palm trees in and around the village furnish the Aponos of Mokaba with a ready supply of their favourite drink, palm-wine; for, as I said before, they are a merry people, and make a regular practice of getting drunk every day as long as the wine is obtainable. I often saw them climb the trees in early morning, and take deep draughts from the calabashes suspended there. Like most drunken people they become quarrelsome, and being a lively and excitable race, many frays occur. Happily the palm-wine season lasts only a few months in the year: it was the height of the drunken season when I was at Mokaba. I saw very few men who had not scars or the marks of one or more wounds, received in their merry-making scrimmages. Their holidays are very frequent. Unlimited drinking is the chief amusement, together with dancing, tamtamming, and wild uproar, which last all night. They are fond of the *ocuya* performances. The ocuya is a man supporting a large framework resembling a giant, and whimsically dressed and ornamented, who walks and dances on stilts. In Mokaba he appears in a white mask with thick open lips, disclosing the rows of teeth *minus* the middle incisors, according to the Apono fashion. The long garment reaches to the ground, covering the stilts. It struck me as a droll coincidence that his head-dress resembled exactly a lady's bonnet—at least the resemblance held good before chignons came into vogue—it was surmounted by feathers, and made of the skin of a monkey. Behind, however, hung the monkey's tail, which I cannot say has its parallel in European fashions, at least at present.—*Du Chaillu's Journey to Ashango Land.*

ARALIA PAPYRIFERA.

The Chinese Paper-plant, as this Aralia is commonly called, is a plant of regal aspect, and may, I think, be considered as the most strikingly beautiful of all the fine foliage plants used for the decoration of the sub-tropical garden. It has been used for several years past in the public gardens of Paris, where it attains such a degree of vigour and size of foilage, as was never seen during the period it occupied a place in our stoves. Though a native of the island of Formosa, the stove is not its proper place. In such a situation its leaves are always a rendezvous for the mealy bug; and there it also lacks that robustness of character which is constantly observed when it is grown in the sub-tropical garden, in which its leaves are perfectly free from that abominable pest of our stoves, and where moreover it appears to revel in all its native luxuriance. In the autumn of 1864 I saw beds of this plant in the gardens of Paris; they were of all sizes, from 3 feet to 8 or 9 feet high. In all cases they stood alone for beauty of foliage and nobleness of aspect, the leaves often measuring 1 foot 6 inches in diameter.

I was delighted last summer (despite the unfavourable weather) to see these plants growing in the sub-tropical garden at Battersea Park, almost as vigorously as in the Paris gardens; and a few small plants turned out in the Horticultural Society Gardens at South Kensington, grew vigorously, and quite covered the bed with their healthy leaves early in the autumn. It must be most gratifying to all lovers of sub-tropical gardens to know that this beautiful plant can be grown successfully in this country.

Sir W. Hooker informs us in the "Journal of Botany" that this Aralia was sent to Kew by Sir John Bowring, then Governor of Hong-Kong, and that a plant 5 feet high produced blossoms in December, 1855, but owing to the unfavourable season of the year the flowers damped off, and did not develop fruit. Sir John Bowring describes a plant in Hong-Kong as being 7 feet high, with a circumference of terminal branches of 20 feet, throwing out from 12 to 14 panicles of flowers, drooping in magnificent plumes and in regular form over its dark palmate leaves.

I am not aware that the plant produces its flowers in the summer season in Europe. As soon, however, as they are lifted in the autumn and placed in the houses they throw up a number of flower-stems, but I fear, from the unfavourable season of the year, that the flowers rarely become developed. A greenhouse temperature is all that is requisite during the winter months; indeed, the plants look much healthier in a greenhouse than in the stove. It is readily increased by cutting up the roots and planting them in rich light soil in heat; the young shoots will also take root freely. The plants should be strong and well hardened off before turning out, and the soil in the bed should be of a light and rich character.—E. in *Gardeners' Chronicle*, March 9.

THE SUN.

The consideration of the comparative lightness of matter composing the sun has led Sir J. Herschel to think thet it is highly probable that an intense heat prevails in its interior, by which its elasticity is reinforced and rendered capable of resisting (the) almost inconceiveable pressure, (due to its intrinsic gravitation) without collapsing into smaller dimensions.

The sun is a sphere, and is surrounded by an extensive and rare atmosphere, and is self-luminous, emitting light and heat which are transmitted certainly beyond the planet neptune, and therefore more than 2,700 millions of miles. Of the sun's heat it has been calculated that only $\frac{1}{2381000000}$ part reaches us, so that the whole amount of it must be past human comprehension, like many other things in science. Our annual share would be sufficient to melt a layer of ice all over the earth 38 yards in thickness, according to Pouillet. Another similar calculation determines the direct light of the sun to be equal to that afforded by 5,563 wax candles of moderate size, supposed to be placed a distance of one foot from the oberver. The light of the moon being probably equal to that of only one candle at a distance of 12 feet, it follows that the light of the sun exceeds that of the moon 80,1072 times according to Wallaston. Zöblner's ratio is 618,000.

When telescopically examined, the equatorial zones of the sun are frequently found to be marked with dark spots, or *maculæ*, each surrounded by a fringe of lighter shade called a *penumbra*, the two not passing into each other by gradations of tints, but abruptly. In the few cases in which a gradual shading has been noticed, Sir J. Herschel believes the circumstance may be ascribed to an optical illusion arising from imperfect definition on the retina of the observer's eye. It is not however always the case that each spot has a penumbra to itself, several spots being occasionally included in one penumbra. And it may further be remarked, that cases of an umbra without a penumbra, and the contrary, are on record, though these may be termed exceptional, and considered as closely relating to material organic changes. A marked contrast subsists in all cases between the luminosity of the penumbra and that of the general surface of the sun contiguous. Towards their exterior edge the penumbræ are usually darker than nearer the centre. The outlines of the penumbræ are usually very irregular, but the umbræ, especially in the larger spots, are often of regular form, (comparatively speaking of course), and the nuclei of the umbræ still more noticeably partake of a compactness of outline. Spots are for the most part confined to a zone extending 35° or so on each side of the solar equator, and are neither permanent in their form or stationary in their position, frequently appearing and disappearing with great suddenness. The multitude of facts concerning them, accumulated from the journals of many observers extending over long periods of years, is so great as to bewilder one.—*Chambers' Descriptive Astronomy.*

POTATO.

Notwithstanding the whimsical objection to potatoes urged by the Puritans, who denied the lawfulness of eating them because they are not mentioned in the Bible, this vegetable must ever be ranked among the best gifts of Providence. The introduction of the potato into England may be thus succinctly stated, It first entered Europe by two different routes. It was introduced from Peru to Old Spain, and thence made its way to Italy and Germany, where special laws were enacted to compel the cultivator of the soil to grow, at least, a certain annual quantity.

Some authors have asserted that Sir Francis Drake first discovered the potato in the South Seas; and others that it was introduced into England by Sir John Hawkins, A.D. 1563. But the plant here alluded to was evidently the sweet potato (*Batatas*), which was used in England as a delicacy long before the introduction of our potato (the *Solanum tuberosum*). The sweet potato was imported in considerable quantities from Spain and the Canaries, and was not considered amiss in restoring decayed vigour. The kissing-comfits mentioned by Shakspeare, Webster, and Massinger, were principally made of these and Eringo roots. At length the Virginian potato (the *Solanum*) both became a substitute for it and appropriated its name.

In 1584 Queen Elizabeth granted a patent "for discovering and planting new countries not possessed by Christians," and under this sanction some ships, principally equipped by Sir Walter Raleigh, sailed to America. In 1585 the first body of colonists landed, under the government of Mr. Lane, in Virgina, so called in honour of the virgin queen. Harriott, a celebrated mathematician of the day, went out to survey the colony; his survey and report, and the introduction of the potato and the tobacco-plant into England for the first time, were almost the only fruits of this attempt. The misconduct of the colonists brought the hostility of the Indians upon them; and they were glad to re-embark within a year on board a vessel of Sir Francis Drake, who was returning from an expedition against the Spaniards in North America, and had been commanded by the Queen to visit this plantation in his way, and see what encouragement or assistance they wanted. In Drake's ship was most probably brought home our potato, since in Harriott's report of the country, printed in De Bry's *Collection of Voyages*, he describes (vol. i. p. 17) under the article "Root," a plant called openawk, which is considered identical with the potato. Gerard, in his *Herbal*, mentions that he had the plant from Virginia; that he had grown seedlings of it in 1590; that it grew admirably in his garden, and recommends the root as a delicate dish, but not as a common food.—*Notes and Queries*, March 9th.

ANCIENT GEOGRAPHY.

The French exert themselves in the publication of geographical matters. It is known that Napoleon the First, who was a special admirer of Strabo, the sage of Amasia, caused a French translation to be made by MM. La Porte du Theil and Coray, which was, however, only completed in 1819 by M. Letronne. This superb work is, by its costliness, not within reach of the majority of readers. Since its appearance so much has been done for the text of Strabo, that the want of a new translation, in a more accessible form, was felt. This has been undertaken now by M. Amédée Tardieu, sub-librarian of the Institute, with the assistance of his colleague, M. Thoulin, Librarian of the Institute. The first volume of this new translation has just appeared at M. Hachette's, the well-known Paris publisher. "La Géographie de Strabon" will form three volumes, and will follow in its arrangement the Greek edition of Meineke, in order to faciliate the use of the original and the translation. All the results of modern learned inquiry have been carefully used, and thus the work promises to do credit to French diligence.—M. Renan, in the *Journal des Débats*, reports on another interesting novelty in this branch of science; it is a photolithographic reproduction of a manuscript of the geography of Ptolemæus, which is in the possession of the Vatogedi Convent, at Mount Athos, and which has been published by M. Firmin Didot. The maps which accompany this manuscript are very valuable as copies of old maps. This manuscript was discovered in 1840 by a Russian traveller; it was described in 1846 by the

Russian Bishop Uspensky, and every page photographed in 1857 by M. de Sewastianow. Unfortunately, the manuscript has suffered cruel mutilations during the years from 1840 to 1857. M. Renan does not say who crippled it in this way. These photographs have been drawn on stone in the Poitevin manner, and are accompanied by an introduction from the pen of M. Victor Langlais, treating on Mount Athos. M. Renan strongly recommends this photo-lithographic manner of Poitevin for the reproduction of old geographical works.—Another geographical work has just appeared at M. Didier's, "L'Empire du Milieu," by the Marquis de Courcy, who lived for six years in China as French Chargé-d'Affaires, and who deserved the thanks of his country for his exertions in the diplomatic negotiations which ultimately resulted in the throwing open to France of this vast and important market. This work is meritorious, for not only had M. de Courcy his eyes open during the six years of his abode, but he has carefully read up the books of English authors and of his countrymen on China. M. de Courcy describes the topography, the manners and religions, government and administration, agriculture, industry and commerce of China; and, finally, gives a sketch of the history of occidental relations with the empire.—*Athenæum*, March 2.

STARLINGS.

The starling (*Sturnus vulgaris*) frequents the old oaks in the forests by thousands and tens of thousands. Every tree during the summer has its several pairs of birds, who build their nests in the holes and decayed cavities in company with the jackdaws. In the autumn they collect together in immense flocks, and leave the district for the winter, resorting to the reed and osier beds on the Trent. Their return to us is very gradual, a few pairs being seen in some years as early as the middle of January, in others not until some weeks later.

Pairing has already taken place in those who reach us the earliest, and their peculiar guttural breeding-call I have heard at the beginning of February. Every week adds to the number until we receive our full complement, and the woods resound with their prolonged plaintive whistle, alternating with an oft-repeated gurgling note.

The starling is not only subject to local migrations, but I believe large flocks leave us for the Continent in the autumn and return in the spring; indeed, the fact that on one occasion seventeen dozen were picked up near the lighthouse on Flamborough Head, which had been killed, lamed, or stupified by flying against the lantern of that brilliant light, seems to leave no doubt on the question, as they were evidently approaching our shores from the Continent.

The great abundance of old decaying oaks in the forest leaves the starlings little to desire in the choice of a nesting place, and with us other sites are but seldom selected; but in 1853 I met with several pairs which had appropriated some deserted holes of the sand-martin at Robin Dam, near Rufford. Pigeon cotes are also chosen; but in these cases the poor starlings become the victims of an ignorant prejudice, the common idea being that they suck the eggs of the pigeons. I fully believe them guiltless of such a habit, and that they are prompted to resort to such places only by a natural instinct to secure a comfortable domicile for their young. The stove-pipe, which I have mentioned as generally occupied by the sparrow, was once selected by a starling for its nest, but its eggs shared the same fate of being half baked.

Insects form the staple of the starling's food, and I think are always preferred when attainable. I have occasionally seen the birds seize insects on the wing, although it is not a common habit, and the first time it came under my notice it struck me as very unusual. A pair had a nest in the hollow of an old oak in the forest, which at the time contained young ones; one of the parent birds flew out of the hole, which it had just previously entered, and was rapidly departing for a fresh supply of food, when it suddenly deviated from its course and seized a large insect which was flying near, and then darted to the other side and captured another. I was within four or five yards at the time, and had a distinct view of what was to me then a novel proceeding; but I have since observed it several times, and particularly so on the 20th of May, 1856, when I saw a number of them hawking for flies in the manner of the swallows. In this case it was no momentary impulse that prompted the habit, as in the first instance, but they were steadily making a business of it, and continued thus employed for some time.—W. J. Sterland (Sherwood) in *The Field*, March 9.

THE SUGAR CANE.

The Sugar Cane is one of a genus of many species of tall Grasses. Like most cultivated plants, it consists of several permanent varieties, differing in size, in the colour of the epidermis, and in the proportion of saccharine matter they contain. Like most of the cereals, the Sugar Cane has not been traced to its wild state. In its cultivated state it has been found in many independent places, often remote from each other, and bearing independent names. Its geographical limits are nearly the same as those of Cotton; that is, extending from the equator to about the 30th degree of latitude. Like Cotton, its culture has been pushed up to the 40th degree, but even with less success, for the cane takes a year to arrive at maturity, and is therefore liable to be cut off by severe frosts. In what country the Sugar Cane was first cultivated it is out of our power to discover; but, as far as we know, it has been immemorially cultivated in the tropical and sub-tropical parts of Hindustan, in the Hindu-Chinese countries, in the tropical and sub-tropical parts of China and Japan, in the Malay and Phillippine Archipelagos, and in the tropical islands of the Pacific. There is no evidence of its having been cultivated in any country west of the Indus. It was unknown as a wild plant in Australia and New Zealand, and is unquestionably an exotic in America. The Greeks and Romans knew nothing of sugar but as an article of trade. They were uncertain about the country which produced it, and ignorant of the plant which yielded it. The Arabs, on the contrary, brought the plant itself from India, with the Indian name of its produce, cultivated it in Syria, in Egypt, in Greece, in North Africa, in Spain, in Sicily, and in Southern Italy, manufacturing sugar from it in all these places. At what time the Arabs introduced the culture of the Cane and the manufacture of sugar into Syria and Egypt is unknown, but it is ascertained that sugar was imported into Venice from the countries enumerated at the end of the 10th century. The Crusaders found the Cane cultivated in Syria as early as the beginning of the 12th century. In the year 1420, or 72 years before the discovery of America, the Portuguese carried the Sugar Cane to Madeira. In the 15th century the Spaniards carried the Cane and manufacture of sugar to the Canary Islands, from whence they were conveyed to tropical America and its islands. In 1503, or about 11 years after its discovery, the culture and manufacture were fully established in Hispaniola. Sugar was, however, an article of consumption in Western Europe long before the discovery of America. England was supplied from the emporia of Venice and Antwerp, and in the time of Shakespeare the name of the article was so familiar as already to have its secondary or figurative meaning, as in the expression, "sugared words."—*Mr. Craufurd on the Migration of Plants.*

DISCOVERY OF CISTS.

Mr. Stuart read two papers communicating the discovery of a singularly-interesting group of Cists at Broomend, in the parish of Inverurie, Aberdeenshire. The first was sent by Mr. James Hay Chalmers, a Fellow of the Society, detailing the discovery of the first Cist; and the second by Mr. Charles Brown Davidson, also a Fellow, with a notice of those subsequently discovered. Broomend is about a mile from the town of Inverurie, and the cists were disturbed in the course of cuttings in a natural sandbank made by Mr. Tait for his paper-mill. The first cist which he discovered was empty and attracted little notice. The next contained two skeletons laid on their sides in a doubled-up position, with the two urns much ornamented placed at the back of the necks. A few flint flakes and pieces of charcoal were in the cist, the bottom of which was laid with a bed of water-worn pebbles, about ten inches in depth. The cist was about five feet three inches in length. There was found in it a large finger ring formed of bone, and a fragment of oak, the cross cutting of which was remarkably smooth.

The cist described by Mr. Davidson was within a few feet of the last. It was 5 feet 5 inches long, formed of stone slabs, of which the joints were cemented with clay (as was the case in the previous cist), and the bottom was formed of small pebbles, below which was a slab. The cist was found to contain a large male skeleton and a young female skeleton. The large one was laying on its left side, with the knees drawn up to the chin; at its back was a large urn much ornamented. The female skeleton was in the north-west corner, in a sitting posture, and behind it was a small urn, also ornamented. Two flint flakes were found behind the shoulder of the large skeleton, and a good many pieces of charcoal appeared among the pebbles at the bottom of the cist. The large skeleton and part of the small one were covered with the skin of an ox of tawny colour. Hanging into the large urn, a lamp of stiffened leather, with a tag of the same substance for suspending it, was found. A miniature cist, containing only a skull and an urn, was also found in the same locality.

Mr. Stuart expressed an opinion that the present find was one of the most valuable which had been recently made, as affording new and carefully observed facts illustrative of the burial usages of our early races, and thus giving us a key to their thoughts and condition. A finger ring seemed to him to be a new feature in deposits of this early character, and the leather lamp, which probably was connected with the burial rites, was also a novelty. Mr. Stuart described a cist recently discovered in the neighbourhood of Elgin, in which a skeleton was found which seemed to have been at least partially enveloped in ox-skin, and along with it the fragment of a bronze dagger, which he exhibited.—*Paper read before the Society of Antiquaries of Scotland.*

WINTER DRESS OF ANIMALS, ETC.

North and North-Western America furnish seven well-marked species of stoat, classed under the general term of weasels, some of which, if not the whole of them, turn white in winter. It is, however, very questionable whether the ermine (*P. erminea*), common to the northern parts of Europe and Asia, is ever found in America; my own experience leads me to think that it is not, although two of the North-Western American species are very closely allied to it. In the neighbourhood of Hudson's Bay the ermine taken is *P. agilis* of Audubon and Bachman; it usually frequents the barren grounds and open plains. I have said that the summer-dress of the ermine weasel is brown, but in northern regions the hairs become milk-white during winter; hence we may describe the ermine as a stoat in its winter costume. It would be very difficult, if not impossible, to discover in the animal world a more beautiful example of God's all-wise providence—displayed in adapting the creature to resemble in colour the various habitats it is compelled to live in, changing, too, in exact accordance with altered conditions of temperature, that concealment, for whatever purpose it may be resorted to, shall be rendered as easy and perfect as circumstances will admit of—than is to be found in the transformation both birds and animals undergo in all high latitudes, from brown to snowy white. We have two admirable instances of this change in the ptarmigan and ermine, although the northern hare, and many other analogous instances of this change might be related if it were desirable. All who have been fortunate enough to see ptarmigan in their summer plumage, amidst the brown heather, hill plants, and lichen-clad rocks and boulders of their favourite hills must have been struck with the close similitude the mixture of colours marking the feathers of the backs and wings, bore to the surrounding rocks and foliage. In a like manner, the brown jacket of the ermine exactly corresponds in colouration with the dried-up vegetation, seen on the sunburnt barren plains over which it loves to roam. But when snow buries all the rocks and leaves, settling on the tops of the pine-tree until they bend beneath its weight, and covering the ground with a carpet of dazzling white, on which any living thing having a trace of dark colour in its clothing would be most conspicuous, then the animals and birds destined to winter amidst such desolation, change, as if by enchantment, from brown to white, and this, not by an actual shifting of the clothing, whether fur or feathers, but to a great extent by the absorption of the colouring-matter, leaving the hair or fur so deprived of the summer tint, white.—J. K. Lord in *Land and Water*, March 16th.

PEAT BED.

A section of the bed appeared in a bank cut through by a small stream near the village of Southend. The bank appears to belong to the "Old Coast Line," which is so well-marked a feature around most parts of the west coast of Scotland. The peat at the point described is 3 feet 9 inches thick; above it is a bed of fine clay, from 13 to 14 inches thick, containing hazel-nuts, followed by a bed of fine yellow sand, 4 feet thick, which is succeeded by a bed of coarse gravel, with small boulders of the thickness of 14 feet. About 400 yards further up the stream there is a bed of fine black-blue clay with mussel-shells. These beds appear to furnish evidence of some five or six different changes of level. (1) The peat-bed has been depressed under shallow and very muddy water, depositing the bed of fine clay; (2) a further depression has subjected this mud to an inroad of the sea, bringing with it the sand which overlies the clay; (3) a further depression, or, possibly, a partial elevation, exposing the same surface to some strong current or littoral action, has brought down upon it the bed of coarse gravel; (4) all these beds have been consolidated and re-elevated above the sea; (5) another depression has enabled the sea to erode the valley of which the "Old Coast Line" forms the boundary, and in which this section is exposed. A long period seems to have followed, during which this old coast-line formed the coast of Scotland, and during that period the upper mussel-bed seems to have been deposited; (6) a final elevation of the land has determined the present coast-line, and left the old one as it now appears—subsequently modified by atmospheric action, and cut through by streams. All these changes have occurred during what, geologically, must be called the existing period, as the vegetable remains in the peat and in the clay seem to be all referable to existing species.—*Paper read by the Duke of Argyle before the Geological Society.*

New Books.

[*Our limited space must of necessity compel us to give but very short notices of new books, but they will perhaps serve as a guide as to what books our readers may ask for at their libraries.*]

The North West Peninsular of Iceland, being the Journal of a Tour in Iceland in the Spring and Summer of 1862. By C. W. Shepherd, M.A., F.Z.S. London : Longmans & Co.

Ornithologists will welcome this little volume with pleasure, and the general reader will find much that is interesting and amusing in its pages. It is an account of a second journey with the intention of exploring the north-west peninsula and the Vatna Jökull, and also of settling some vexed questions in Ornithology. Seldom have we taken up a more genial or pleasant work; and if, after having read it carefully through we find a fault, it is that there is not more of it; small as it is it will be found a good companion to the works of Mr. Baring Gould, our chief informant hitherto.

The manners and customs of the inhabitants are pourtrayed in a very happy and homely style, while the accounts of the various birds will gladden all those who make Ornithology their chief study. Iceland would seem to be the very paradise of ducks; so many were there in some parts that it it was difficult to walk without treading upon their nests. Some idea of their quantity may be gathered from the following :—

The island being but three-quarters of a mile in width, the opposite, or southern shore was soon reached. On the coast was a wall built of large stones, just above the high-water level, about three feet in height, and of a considerable thickness. At the bottom, on both sides of it, alternate stones had been left out, so as to form a series of square compartments for the ducks to make their nests in. Almost every compartment was occupied, and as we walked along the shore a long line of ducks flew out one after another. The surface of the water also was perfectly white with drakes, who welcomed their brown wives with loud and clamorous cooing. When we arrived at the farm-house we found that the haymakers had apprised their mistress of our approach. She gave us a cordial welcome. The house itself was a great marvel; the earthern walls that surrounded it, and the window embrasures were occupied by ducks. On the ground the house was fringed with ducks, on the turf slopes of the roof we could see ducks.

A grassy bank close by had been cut into square patches like a chess board, (a square of turf of about 18 inches being removed and a hollow made, and all were filled with ducks). A windmill was infested, and so were all the out-houses, mounds, rocks, and crevices. The ducks were everywhere,; many of them were so tame that we could stroke them on their nests, and the good lady told us that there was scarcely a duck on the island which would not allow her to take its eggs without flight or fear. On entering the house we were shown into a little room, whose furniture was very grand for Iceland. Four maidens soon came in, each bearing a large bowl of milk. Each in turn approached the table, and taking a sip from her bowl, placed it before us. Our hostess told us that, when she first became possessor of the island, the produce of down, from the ducks, was not more than 15lbs. weight in the year, but, that under her careful nurture of 20 years, it had risen to nearly 100lbs. annually. It requires about 1½lbs. to make a coverlet for a single bed, and the down is worth from 12s. to 15s. per pound; most of the eggs are taken and pickled for winter consumption, one or two only being left to hatch.

Hard Money.

For President,
W. B. Chandler.

For Vice President,
Miss E. Bogardus.

For Secretary,
C. Barry.

For Treasurer,
C. B. Gibson.

For Prosecuting Attorney
F. M. Palmer.

For Marshal,
H. Gilkerson.

FOR SENATORS.
E. Kays, Miss C. Spruill,
. L. Richards, " G. Cushman
. C. Sargent, " E. Page,
H. Beardsley.

To Fill Vacancies,
For 1 term, E. O. Lee.
For 2 terms, J. C. Lewis.

Mr. Shepherd says to intending visitors the Ornithologist should visit Iceland in the spring, and endure with what patience he can the storms of that season. The tourist will do well to delay his visit till the summer, as the weather is charming from the middle of July to the middle of September.

There are several coloured illustrations in the volume, taken from sketches drawn on the spot by Mr. G. G. Fowler.

Sunshine and Showers, their influence throughout Creation, a Compendium of Popular Meteorology. By Andrew Steinmetz, Esq. London: Reeve & Co.

Mr. Steinmetz has endeavoured, in the present volume, to exhaust the subject of the weather in all its meteorological bearings, and, so far as we can judge, seems to have done so with complete success. As the weather is the principal topic of conversation with our countrymen, they will, no doubt, be well pleased to obtain a work that will give them more information upon the subject, in a readable form, than any that has hitherto been issued for that purpose.

In addition to the very pleasant reading, there is much to be learned from the present volume, and we would more especially call our readers' attention to the chapter on lightning, upon which subject it would be well for all of us to have some acquaintance. Mr. Steinmetz says:—

"From a note presented to the French Académie des Sciences, by M. Boudin, it appears, that during the period elapsed between 1835 and 1863, that is 29 years, no less than 2,238 persons were struck dead by lightning. The annual maximum has been 111, the minimum 48; but if we add the number of injured to that of the dead, the total number of the victims exceeds 6,700, and the average per annum is 230."

And further on he says:—

"Out of 6,714 persons struck by lightning, it is not surprising to find that, about one-fourth have been struck *under trees*. In spite of the everlasting warning as to the avoidance of that fatal neighbourhood during thunderstorms, obviously people rush under trees to get shelter from the rain; but, when the terrible danger is known, we apprehend that few will do so. It is quite certain from present statistics, that 1,700 persons out of 6,714, would have escaped death, or severe wounds, by avoiding the vicinity of trees during a thunderstorm."

It appears that females are much less likely to be struck than males; that out of a number of 880 victims, there were only 233 females, only a few more than a fourth; another curious fact is, that some persons are more liable to be struck than others, and one man is spoken of who was struck three times in three different dwellings. This information and a great deal more, is of the most important value to the public, and we therefore hope Mr. Steinmetz's book will meet with a very large body of readers. It certainly deserves to be in the hands of everyone, both as a source of amusement and profit. The many who affect to be weather wise, will probably find their wisdom of a more reliable kind after a perusal.

Descriptive Astronomy. By George F. Chambers, F.R.A.S. Oxford: The Clarendon Press.

A very valuable work on Astronomy, the aim of which is to be generally useful, scientific without being technical, and popular without being vapid. The author says "preferring facts to fancies, I have confined, within very moderate limits, theoretical considerations, and especially have I avoided chronicling any of those mischievous speculations on matters belonging to the domain of recondite wisdom, which have within the last few years borne such pernicious yet natural fruit. The latest information is given on all branches of the science, carefully arranged, and plentifully illustrated with woodcuts, executed under the author's own superintendence. The volume is beautifully printed, and well deserves a place in every gentleman's library.

The Twin Records of Creation; or, Geology and Genesis, their perfect harmony and wonderful concord. By George W. Victor Le Vaux. London: Lockwood & Co.

A nicely printed little volume, with excellent illustrations, in which the author endeavours to prove the affinity between the two records, Genesis and Geology. The various phases of geology are arranged to correspond with the seven days of scripture, and the progress of the earth is represented as agreeing with the mosaic narrative. Our readers must judge for themselves how far they agree with the author, as such a subject is scarcely fit for discussion in our pages; but we may add that those who procure the volume will find much interesting matter written in anything but a dry manner.

Australia as it is; or, Facts and Features, sketches and incidents of Australia and Australian Life, with notices of New Zealand. By a Clergyman. London: Longmans & Co.

An unbiassed description of Australia, containing a multitude of facts collected during a residence of thirteen years. What the author saw and heard has been treasured up for the benefit of those who wish to become acquainted with details of the country. The volume will be found interesting to many besides those who seek for descriptions of nature; as the author has devoted a portion to the consideration of manhood suffrage in Australia, in a chapter headed "Democracy and its results," to which he especially calls attention.

The following works, likely to interest our readers, have appeared during the past few weeks :—

An Elementary Treatise on Quartz and Opal. By George William Traill, F.G.S.E. 4s. Edinburgh: Maclachlan & Stewart.

A Memoir of Thomas Bewick. Written by Himself. With numerous Woodcuts of Fishes and Vignettes by the Author. 1 vol., cloth, 13s. 6d.—Also, *A History of British Birds.* By Thomas Bewick. 2 vols., cloth, 31s. 6d. London: Longmans & Co.

Illustrated Natural History of British Moths. By Edward Newman, F.L.S., F.Z.S., &c. In Numbers, price 6d. each. Nos. I. to V. now ready, the others to follow monthly. W. Tweedie, 337, Strand.

A Book of Angling, a Complete Treatise on the Art of Fishing in every Branch. By Francis Francis. With 15 Plates. Post 8vo, 15s. London : Longmans.

Domestic Medicine: Plain and Brief Directions for the Treatment requisite before Advice can be obtained. By Offley Bohun Shore, Doctor of Medicine of the University of Edinburgh, &c. 2s. Edinburgh : William P. Nimmo.

Correspondence.

Under this head we shall be glad to insert any letters of general interest.]

POTATO DISEASE.

SIR,—I beg to inform "A Lover of Flowers" that the potato disease is occasioned by a minute fungus, *Botritis infestans*, and was first known in this country in the year 1845. This parasitical fungus, or mould, at first preys upon the tissue of the leaves, those brown spots on them being the primary visible results of its presence. It speedily spreads over them and the stems, and by the latter descends to the tubers, on which it too often feeds greedily, leaving behind disorganized tissue, which generally soon becomes converted into a mass of putridity. In the diseased tubers, before they become rotten, the starch is wholesome.

The cause of the fungus attacking the potato we know not. The only thing we do know respecting it is, that whenever the plants have attained a certain development, and the season sufficiently advanced, it makes its appearance, and according to circumstances, preys on leaves, and stems, and tubers, more or less. From what I have seen of its effects upon varieties differing in degree of vitality, all cultivated in the same plot, I am of opinion that the *constitution* of the variety has a great deal to do with it. By this I mean, that varieties of a weak constitution and habit are more easily preyed on by the fungus than those having a stronger constitution, such as robust habit, firmness of tissue, &c.

In order to prevent, or at least lessen, the chances of the disease, some plant early, while others dust the sets with sulphur—both of these remedies have their advantages. The early planting is decidedly of great importance, for by it the tubers will have reached to maturity before the disease appears, or, at least, to an almost complete state of organization, when it seldom attacks them. For a similar reason some often employ tolerably precocious varieties, and though the produce is small, yet, in moist unfavourable seasons it often escapes the ravages of the disease, and outweighs the sound crop of late varieties. The sulphur being poisonous to the parasite, sometimes materially retards its progress. As, however, it establishes itself primarily in the interior of the living tissue, and subsequently fructifies externally, it is exceedingly difficult, if indeed possible, to apply a remedy. It is difficult for us to defeat these minute fungi, or moulds, and this difficulty arises from our imperfect knowledge of their sudden and mysterious appearances and development. We can understand and have control over the higher organized forms of vegetable life ; but the lower, alas ! are often incomprehensible and uncontrollable. We see them, but know not how nor whence they came, and being ignorant of their origin, we are also ignorant of their exit.

Besides the *Botritis infestans*, the potato is subject to the parasitism of another mould, *Fusisporium solanii*, which likewise is very destructive to the unfortunate *Solanum tuberosum*, in bringing on decay to all the parts preyed upon by it.

Hoping that a "Lover of Flowers" may receive information from other sources,

I am, Sir, yours &c.,

Kew. R. K.

SIR,—On reference to "A Lover of Flowers'" inquiry regarding the "potato disease," in No. 3 of your magazine, I think I can enlighten him a little. In the district of which I speak (which is in Dumbartonshire) it appeared, in or about 1845, as a small dark-brown spot on the under part and sometimes in the "eyes" of the potato, which spread all over ; and on being housed, even if quite good, in two or three days the smell became unsufferable. About the end of August and beginning of September, when a *mist* hung over the field at nightfall, in which the "mischief" was supposed to lurk (same theory as that of Mr. Glashier, the aeronaut, and others on the "cholera mist"), the *leaves* were afterwards invariably found to be spotted, similar to the potato itself, which diverged over the leaf and came down the stalk in a yellowish autumnal hue. Its ravages were greater in low-lying damp ground, and the potatoes worse tasted. Lime and other preventatives were tried, but were of no material use, and, as far as I can learn, about the half of a crop was usually useless, although it may not have been so destructive in other parts. On one or two occasions when the ground above the planted potatoes was tramped firm, by mere chance, there was scarcely a diseased one to be found.

Greenock. J. R.

INSECT LIFE.

SIR,—The insect mentioned by Mr. Ade in his letter contained in your last number, is, I think, *Mellinus arvensis*, a species of burrowing wasp, which is very common in the country, particularly in autumn. The female is larger than the male. The object of the *hole*, or *burrow*, is to provide a home for the education of the young Mellini. The construction of the habitation itself appears to have been accurately observed by your correspondent—the subsequent part of the insect's labour he appears not to have seen. This I shall endeavour to describe in as few words as possible. Having made the burrow, it next proceeds to catch flies, which it brings to the hole one at a time. Removing the clay or pebble from the entrance, it thrusts the fly to the bottom, and having deposited an egg on it, re-closes the entrance. The Mellinus then goes away again for another fly, and returns to the burrow as before, and this it does until a sufficient number of flies has been collected. According to Wood, each larva requires six flies, on an average, eating all but the head, limbs, and greater part of the thorax. When full grown it spins a cocoon, and passes into the chrysalis state in the burrow. The common sand-wasp (Ammophila gabulosa), which is rather longer and more slender than Mellinus arvensis, and has not so many *bands* on the abdomen, also makes a burrow in the same way, storing it with caterpillars instead of flies, and *Philanthus triangulum* (so called from the triangular marks on the abdomen), about the same size as Mellinus arvensis, stores its burrow with honey-bees, which it previously stings to death. The small *Pemphredon lugubris* (so called from its funereal aspect), great numbers of which I saw and watched last year, make a burrow in decayed wood, which it stores with aphides. All these insects have stings. For further information respecting these, and other mining and boring hymenoptera, I may refer to Kirby and Spence's "Entomology," cheap edit., p. 159; Rennie's "Insect Architecture;" and Wood's "Garden Friends and Foes," which book I would strongly recommend to the *Entomophilist* who wishes to become acquainted with the names and habits of our common insects without proceeding to much scientific detail.

I am, &c.,

Milesdown, March 11. T. A. H.

SIR,—Although I cannot lay claim to being anything more than an "Entomophilist," like Mr. W. H. Ade, I think I can give him an answer to his query respecting the insect of which he gave a description in your last issue. From the various authorities I have searched, and from my own observation, I imagine this insect to be the mason wasp (*Odynerus muraria*, Latreile). It is so called from its habit of boring a cylindrical hole from two to three inches deep in the ground (generally of a sandy nature) for the purpose of depositing its egg in it. At the same time it siezes a large caterpillar or maggot, which it also deposits in the cavity with the egg, and closes the mouth of the hole, as your correspondent observes, with a small stone or piece of earth. At certain periods she revisits the nest and lays in another stock of food for her progeny.

What wonderful instinct does this little worker display, both in the formation of her nest, the knowledge of the exact time when the food of the larva will be exhausted, and the remembrance of the exact situation of the nest! The wasp is also extremely careful about closing the mouth of the cell, to prevent ichneumons from laying their eggs in the larva, which would soon cause its death. As far as I can learn, the mason wasp stings, and has the same members with the other members of the same family. Hoping this most imperfect account will be satisfactory to your correspondent,

I remain, Sir, yours, &c.,
ARTHUR G. HARVIE.
London, March 2, 1867.

SIR,—The insect Mr. Ade refers to in your last number of the "N. N. B." belongs to the genus Odynerus, generally called mason wasps. A male and female usually work together—the female, however, does the greatest part of the work connected with their lonely hive. After the nest is formed in a bank, or soft stone or brick wall, the female generally supplies the young with a stock of caterpillars, which the grubs manage to consume before they enter into the pupa state, or winter sleep. The entrance to the nest is concealed, to secure the young wasps from ichneumon flies. I do not think that any of the family of insects are carniverous; but there is one kind of mason wasp (*Mellinus* *arvensis*) that feeds its young with living flies—it is probable that Mr. Ade saw some of that family.

I wish some student of the hymenopterous branch of entomology would favour your readers with information on the various species of the genus Odynerus. I should be pleased to see some good articles on entomology in your journal.

I am, Sir, yours, &c.,
I. P. BELLINGHAM.
Redruth, March 4.

WHAT ARE SHOOTING STARS?

SIR,—Perhaps the following facts and suggestions respecting the nature of shooting stars may prove of interest to your readers.

Dr. Reichenbach, of Vienna, has shown that the tops of mountains are covered with a dust which contains nickel, cobalt, phosphorus, and magnesia, the usual constituents of meteoric stones, in considerable quantities. He believes that this dust pervades all space and reaches the earth in the form of an impalpable powder, which sometimes agglomerates so as to form meteoric stones of different sizes.

Again, it has been found, by M. Schiaparelli, an Italian astronomer, that the elements of the orbit of the August meteors agree with those of a moderately large comet observed in 1862.

Putting these facts together, would it not seem that the meteors observed periodically are neither more nor less than *comets* revolving in an orbit nearly coincident with that of the earth, and that meteoric stones are in no way connected with those appearances? This would account for the fact that none of the November meteors reached the earth, as their density would not be sufficient to enable them to penetrate the atmosphere to any great distance.

I am, Sir, yours truly,
Faversham, March 14. GULIELMUS.

MOLE AND MOUSE.

SIR,—In the summer of 1858 I discovered a small quadruped resembling a mouse at first sight, but examining, it seemed a cross between a mole and a mouse. The body, slightly elongated, legs and feet, long hairy tail, were those of a mouse, but the entire head was a mole's, as neither ears nor eyes were prominent. It possessed the real snout for excavating, and the soft, velvety, black fur too. I caught it with little difficulty, and had it for several hours. On being allowed down, it seemed exceedingly anxious to be out of sight by burrowing. I eventually let it go "on its way, and I saw it no more." If such a combination was possible, it is surely a singular coincidence. It is not the shrew-mole (Scalops aquaticus), as it is about the size of the common mole, and its colour bright lead, and only to be found in North America.

Yours. &c.,
Greenock. J. R.

TO CORRESPONDENTS.

ERRATA.—Page 73, in an article on the Atmosphere—"The air is blending of subtle gases, of which more than 99 per cent. consists of Oxygen and Hydrogen;" for *Hydrogen* read *Nitrogen*. This mistake also occurs in the number of *Good Words* for February, from which it was copied.

W. H. A.—1. The words stripped for striped is an error, also melancolicus for melanc*h*olicus, the remainder are correct.—2. The tree *is* the Wellingtonia gigantea; Mr. James Smith, Darley Dale nurseries, near Matlock, has one, of which he says:—"We have a plant of Wellingtonia gigantea that was planted out of a thumb pot, being then one year old, about 2in. high, in the summer of 1853. It measures now as follows: at the ground, 4ft. in girth; at 6in. from the ground, 3ft. 7in.; at 12in. ditto, 3ft. 6in.; at 36in. ditto, 2ft. 5in. Its height is 19ft. 3in., and the space covered by the branches is 30ft. in circumference."—3. Will try and put your letter on the "Derivation of Words" in our next.

M. L. A.—We have not room for your letter in the present number. If the subject is re-opened in our next, will insert.

Short Notes.

THE MACAW.—I do not know whether the capricious nature of the macaw is well known. Possessing a most handsome orange and blue macaw, on whom I bestow a great deal of attention, either feeding him from the hand or placing the food in his pan myself, many opportunities are afforded me of witnessing his extremely variable disposition. To day he will devour with avidity that food which to-morrow will be refused by him; and although I have given him many kinds of food, yet, after the lapse of three months, I am unable to determine which food he appreciates most. One incident is worthy of record, as it shews he is susceptible of grateful feelings. Being confined to my room through illness, the macaw made known his regret at my absence by loud and piercing shrieks, by refusing his food and overturning his pan. He resisted, by unmistakeable signs, the efforts of those who tried to pacify him; the bird, at other times tractable enough, was now pronounced "an ill-natured creature." At first when I was able to visit him he did not appear to know me, but, on hearing my voice he instantly recognised me, and allowed himself to be fondled, uttering a low chirp, far different from the horrid shriek, raising his wing and holding out his leg, thus demonstrating his pleasure at seeing me again. I was positively told that it would be of no avail offering him any food, as he would certainly refuse it; such, in fact, was not the case, for he ravenously ate the proffered food. It is stated by Bechstein that this bird is remarkable for imitating the barking of dogs, mewing of cats, &c.; but although he imitates the human voice distinctly, I have not found this to be the case. Perhaps, however, the experience of some of your readers may be different from mine on this point.—*Philopsittacos.—Field.*

NATIVES OF ANDAMAN.—The Andaman is rather the negro of Africa, the true woolley-headed negro in every particular but one, he has no excessive projection of the heel. He is a small specimen of humanity—being only four feet nine or ten inches in height, but well-made, lithe, and active; he wears no clothes of any kind, is armed with a singular bow of great power and a bunch of arrows, is quick and intelligent, and as a proof of his docile nature he is tender towards children, caressing them with as much gentleness as the most civilized people manifest for infant helplessness (at least such was the conduct of the only Andaman islander we have any account of, a young Andamaner, who was captured in the year 1858, and taken to Calcutta, where unfortunately he died in a short time; he behaved with decorum, he recognized his photograph—a trifling fact apparently, but significant of mental powers above other savages, and had the quick joyous laugh of the negro races; they occupy their time in seeking food and the manufacture of nets, boats (to contain eight people) with an outrigger similar to the native boats of Ceylon, arrows, and hard-wood arrow heads, their simple huts in which they always set up the skull of a hog, on the forehead of which they make certain marks in red earth, a custom that can be traced to nearly all the islands of the Indian Archipelago as far north even as Jesso, as we saw lately in some Japanese drawings, illustrating these curious hairy people, in which is a bear-skull on a pole near to their huts, whatever the symbol may mean.—*Land and Water.*

BOMBYX CYNTHIA.—Dr. Wallace exhibited numerous specimens of the cocoon and imago of Bombyx Cynthia, and the silk thereof. One was a double cocoon, the joint work of two larvæ. Another cocoon, formed in 1865, and which in due course ought to have produced a moth in 1866, contained a still living pupa, which would probably hatch in 1867. He mentioned that though the moths were greedily eaten by fowls and other birds, the larvæ, though not hairy, were rejected; and that when Ailanthus leaves were not procurable the larvæ had been found by Captain Hutton to thrive on honeysuckle. The moths of B. Cynthia were subject to considerable variation in size and coloration. He had invariably found that at the commencement of the hatching out of a brood the males greatly outnumbered the females, whilst at the end the reverse was the case: he argued that in proportion as the individual was finer the time required for its metamorphosis was longer; hence in general the female, which was the larger and heavier insect, was preceded by the male, which was smaller and had less to mature. He thought Bombyx Guerinii and B. Ricini were probably only varieties or local forms of B. Cynthia. Lastly, Dr. Wallace mentioned that he had frequently observed a sound to proceed from the eggs of B. Cynthia, "a sort of click, a single sound generally in the second week," which was attributed to "the parchment-like shell being pressed out with a spring by the effort of the larva within, and returning to its concave form."—*Paper read before the Entomological Society.*

THE JACKDAW.—There is in the parish in which I reside (Melbourne) a somewhat remarkable character. He ought to be more honest than he is, for he resides with a policeman. This character is a jackdaw. One morning a lady in the place lost a gold watch and chain and several valuable rings. Many were the conjectures about the loss, but at last it was pretty correctly ascertained that Master Jack had carried them away. The watch proved too heavy for him, and he dropped it about fifty yards from the house. One morning he paid a visit to my house and he was watched very closely. He entered a bedroom through an open window and eyed the contents of the room. Then he placed himself before a mirror on the dressing table, and walked backwards and forwards with great self-conceit, evidently thinking that no bird in the universe had a coat half so glossy as he. The pincushion caught his eye, and he immediately amused himself by picking every pin out of it and strewing them about very adroitly, taking care that not one of them should prick him. That finished he set to work to pull the bottom of a chair to pieces, very much to his own satisfaction and to our annoyance. At this juncture our patience was exhausted and in we rushed, but Jack was too sharp for us and flew away through the window, chattering at us a provoking "caw, caw." —JOHN JOSEPH BRIGGS (King's Newton, Swarkeston, Derby).—*Field.*

GARDEN PRODUCTIONS OF NATAL.—Most of the European vegetables can be grown in the uplands of Natal. The beetroot and turnip thrive in many districts. Beans, peas, onions, cucumber, cauliflower, cabbage, and lettuce, in every variety, are common in the gardens. The pumpkin flouriehes like a weed, and yields the most astonishing crops. The tomato and capsicum ripen in luxuriance. The capsicum is grown for commercial purposes; 18cwt. of cayenne pepper, worth £86, was exported from Natal last year, in addition to the quantity consumed in the colony. The pine-apple, papaw, and banana are common everywhere on the coast. The orange is found in great plenty in certain districts; there are individual trees in the colony that yield 45 bushels of fruit. The gardens of Maritzburg furnish peaches, apricots, nectarines, apples, mulberries, medlars, grapes, raspberries, figs, guavas, the granadilla, loquat, and St. Helena peach. Ginger and turmeric are common productions in many gardens. The tea-plant grows readily in the lands that are suitable to the coffee. It has not hitherto been planted in any quantity, and a gentleman near Durban is now making arrangements to see what may be done with it on a somewhat large scale. Indigo grows everywhere. Arrowroot has long been manufactured in some quantity in the coast district, and would be very largely produced but for the limited and uncertain market that it commands. Natal arrowroot is now known in the English markets as being of unexceptionable quality.—*Natal Land Settlement Pamphlet.*

HEARING OF DECAPOD CRUSTACEA.—Sir John Lubbock, in his address to the Entomological Society, says:—"We do not yet thoroughly understand how they [Crustacea] see, smell, or hear; nor are entomologists entirely agreed as to the function or the structure of the antennæ. This interesting subject offers a most promising field for study, and I would particularly call the attention of entomologists to a remarkable memoir by Hensen on the auditory organ in the decapod Crustacea. Henson has shown that the [supposed] otolithes in the open auditory sacs of shrimps are foreign particles of sand, *introduced into the organ by the animal itself*. He proved this very ingeniously by placing a shrimp in filtered water without any sand, but with crystals of uric acid. Three hours after the animal had moulted he found that the sacs contained many of these crystals. M. Hensen has also shown that each hair in the auditory sac is susceptible of being thrown into vibration by a particular note, which is probably determined by the length and thickness of the hair. It may be experimentally shown that certain sounds throw particular hairs into rapid vibration, while those around them remain perfectly still."

THE BERBERRY AND ITS USES.—The Berberry (Berberis vulgaris) is a deciduous shrub, a native of Britain in woods and hedges on dry soil, and sometimes planted in gardens for its fruit; which is not eaten raw but is excellent when preserved in sugar, in syrup, or candied. The berries are also made into jelly and rob, both of which are not only delicious to the taste but extremely wholesome, and they are pickled in vinegar when green, as a substitute for capers. They are also used instead of lemon for flavouring punch, for garnishing dishes, and for various other purposes, independently of their medicinal properties. When the fruit is to be eaten, there is a variety in which it is larger and less acid, B. vulgaris, var. dulcis, of which there are plants in the Horticultural Society's Gardens, from which scions may be procured for budding or grafting on the common berberry. For all the other purposes the species may be taken, though for the curious there are varieties with yellow, white, purple, and black coloured fruit; and there is one also without seeds, B. v. asperma, of which the delicious *confitures d'épine vinette*, for which Rouen is so celebrated, are made.—*Loudon's Horticulturist.*

EARTHQUAKES.—The cause of earthquakes is very obscure, and many theories have been brought forward to account for them. All agree as to their connection with volcanoes, and that they are produced by the same subterranean agency. Sir H. Davy, when he discovered the metallic bases of the alkalies, suggested the idea that those metals might abound in an unoxidized state beneath the crust of the earth, and that when water came in contact with them, gaseous matter would be set free sufficient to produce the earthquake; the metals would combine with the oxygen of the water, and the heat evolved melt the surrounding rocks. When an eruption takes place at the bottom of the sea, large fissures are opened, through which the water pours on the heated surface beneath. The trembling which precedes the shock is then felt; a vast volume of steam is raised in the cold water above; the force is transferred in all directions, at the rate of thirty miles an hour and in amplitude for several miles. The Lisbon earthquake was felt at Finland, Canada, the West Indian islands, an area of 7,500,000 miles: 150,000,000 cubic miles of water was displaced, and the returning wave at Cadiz was sixty feet high.—*Land and Water.*

POULTRY FOR A FARMYARD.—We have seldom seen a farmyard that had not half a dozen poultry houses already made. Any house that possesses the following qualifications is a poultry-house:—Height from 5 to 8 or 9 feet; water-tight roof of any kind; ventilation just under the roof or within a foot of it; door at one end; earthen or gravel floor; if opening into the yard, and near to stacks and ricks, so much the better. The floor of the house should be higher than the level of the yard, and should rise in all directions from the door. A calf-pen often makes a good fowl-house. Roosting on carts and waggons and under sheds and lean-to's is often more favourable to health than a well-appointed house with all modern appliances. If, therefore, the birds are safe from thieves or from foxes, we advise you to let them roost at will. You will have to look after their eggs. Dorkings do well in a farmyard; it is their place. Brahmas and Cochins are hardier, and very good layers. Hamburghs, La Flèche, Houdans, and Crève Cœurs are excellent layers but do not sit. All the latter lay larger eggs than Hamburgs.—*Journal of Horticulture.*

MICE BREEDING IN DOVES' NESTS.—A correspondent of *Land and Water*, relates the following curious fact upon this subject:—"A pair of doves confined in a wicker cage, which was suspended in the hall of a lady's residence in this parish, prepared their nest and produced two eggs, the ordinary complement. During the process of incubation two young dead mice were one day observed lying at the bottom of the cage, but they disappeared in the course of the night. Upon the ensuing morning an examination was made, when it was discovered that a mouse had taken possession of the doves' nest, which contained three live, and it is presumed, the two dead mice. This joint possession had been enjoyed apparently without conflict; I say apparently, because although the female dove remained tenant in occupation, one of the eggs was found broken; the hand of fate was not slow to overtake the invaders, and the parent mouse having been presently entrapped, all suffered the punishment of death for the unhallowed intrusion; humanity recoiled from the massacre, but the predatory habits of the 'varmen' forbade a mitigation of the penalty."

THE METEORIC SHOWER.—The meteoric shower of November last forms the subject of contributions from nineteen different observers to the *Monthly Notices* of the Royal Astronomical Society. Two observers in Kent report that in three hours of the night of the 13th—14th they counted 5,600 meteors, of which number 1,600 streamed past in eight minutes. The time of this great stream was from two to ten minutes past one A.M. Sir John

Herschel, from careful observation, fixes the radiant point of the meteors less near the star γ Leonis than other observers, and in longitude 142° 20′ and in latitude 10° 15′ north. The Astronomer Royal remarks that the meteors had not much motion towards or from the sun; but were moving perpendicularly to the plane of the ecliptic, from north to south, with an absolute velocity nearly one-fifth part of the velocity relative to the earth in the direction of the earth's motion. And he concludes that the inclination of the orbit of the meteors to the ecliptic is less than nineteen degrees.—*Athenæum.*

ARCTIC FLORA.—A beautiful valley lay there nestling between the cliffs and rich in arctic vegetation. It was covered with a thick turf of moss and grasses, among which the *Poa arctica*, *Glyceria arctica*, and *Alopecurus alpinus* were most abundant. In places it was indeed a perfect marsh; little streams of melted snow meandered through it, gurgling among the stones, or dashing wildly over the rocks. Myriads of little golden petalled poppies (*Papaver nudicule*) fluttered over the green; the dandelion (*Ranunculus nivalis*), with its smiling, well-remembered face, was sometimes seen, and the less familiar *potentilla* and the purple *pedicularis* were dotted about here and there. The saxifrages—purple, white, and yellow—were also very numerous: I captured not less than seven varieties. The birch and crowberry, and the beautiful *Andromeda* (the heather of Greenland) grew, matted together, in a sheltered nook among the rocks, and, in strange mimicry of southern richness, the willows feebly struggled for existence on the spongy turf: with my cap I covered a whole forest of them. —*Dr. I. I. Hayes*, *The Open Polar Sea.*

UPLANDS OF AMERICA.—In these uplands Nature is lord and king. Snipes and plovers abound; blackbirds, carrion crows, ravens and vultures are also seen. Flowers are still common; most of all, the dwarf sunflower, which is sown so thickly through the landscape as to give it a shimmer of burning gold. The dwarf sunflower is, in fact, *the* prairie flower, lighting up the face of nature everywhere in our route, from the Missouri river to the Great Salt Lake; in some parts growing low and stunted, the stalk not one foot long, the flower not higher than a common marigold, in others rising ten or twelve feet high, with clusters of flowers each as big as a peony. Ants are toiling in the ground; the little prairie-dogs, comedians of the waste, sit crowing on their mounds of earth until we drive close up to them, when they utter a quick laugh, and, with a shout of mockery, plunge into their holes, head downwards, disappearing from our sight with a last merry wag of their tails. Owls, prairie-dogs, and rattlesnakes live on the most friendly terms with each other; the owls and snakes dwelling in the prairie-dogs' holes, and sometimes, I fancy, eating the dogs when they happen to be short of food.—*Hepworth Dixon's New America.*

SONG OF THE LARK.—A correspondent of the *Field* suggests that larks sometimes sing from joy and sometimes from the contrary, and in corroboration of the latter, relates the following:—"I was walking yesterday in the fields, when I noticed a small hawk rapidly skimming the ground and dipping over the hedges as they do when bent upon mischief. I therefore watched, and soon saw him encounter some larks, one of which being singled out, immediately took to soaring, after its idea of safety. The hawk rising likewise, was making rapid passes, and the bird eluding them, when I heard the air filled with the well-known gush of song of the lark, which seemed to come just after a swoop was missed. I think I am not mistaken in attributing the notes to the terrified bird that was being chased. The songsters of the neighbourhood (and I have heard none before) would have been surely silent with a hawk in their midst, and I could scarcely be wrong about the direction of the sounds."

BROWNEA GRANDICEPS.—A magnificent head of flowers of Brownea grandiceps was shown from the garden of Sir Hugh Williams at Bodelwyddan. The tree which produced it was stated to be of considerable age and of large size, so much so indeed that the house in which it is growing has had to be enlarged once or twice, in order to give it sufficient room. It has long pinnate leaves with about 12 pairs of leaflets, and axillary or terminal bright crimson flower-heads 6 or 8 inches in diameter. The flowers are very numerous, and are arranged in tiers, as it were, round a conical axis, the outer ones expanding first. This species is a native of Venezuela, where it is called Rosa del Monte or Palo de Crux, and was introduced into this country some 40 years ago. It is nearly related to Amherstia and Jonesia, and besides flowering with Sir Hugh Williams has also blossomed at Chatsworth, Glasnevin, and other places, in which for its great beauty it has been much admired.—*Royal Horticultural Society*, March 5th.

FLOCK FROM THE BULRUSH (TYPHA LATIFOLIA).—I think it would be useful for many poor people to know that the common Bulrush is excellent for stuffing beds, pillows, &c. My attention was called to this by our upholsterer, Mr. Read, who has been using it through the winter himself upon trial, and who speaks highly of its usefulness. I send a portion, and I think it will surprise you to find the quantity that one head produces. I should not think it required anything beyond gathering when fully ready in the autumn, and well drying, when it will come easily from the stem—at least this is all that has been done with the sample I send. When we consider how plentiful this plant is in our lakes and rivers, in all the three kingdoms, there cannot be any doubt it would prove a great boon to many poor people, if used for purposes of this sort.—*J. F. Cliveden.—Gardeners' Chronicle.*

A KNOWING DOG.—A lady, residing near Ayr, has a pet terrier, which, among other accomplishments, performs the duty of domestic letter-carrier. The other morning his task was easy, for there was only one letter, and away he trotted with it as usual. His mistress was returning to the house, and, passing the window, was alarmed at seeing Fido, instead of laying the letter on a chair, toss it into the fire. Rushing into the room, the lady rescued the epistle, with only one corner singed. Judge of her surprise (and account for the fact, ye sceptics, as best ye can) to find that the letter the indignant Fido had tried to commit to the flames was a tax paper, with a charge of 12s. for himself! The incident is the more singular as he never previously took any such liberty.—*The Queen.*

Remarks, Queries, &c.

(*Under this head we shall be happy to insert original Remarks, Queries, &c.*)

BIRDS NEAR LONDON.—I forward you a list of *some of the birds observed in and near Leytonstone, Essex,* for insertion in your next number. As we are only *seven miles from the metropolis,* perhaps this may be interesting to some of your readers :—

Peregrine Falcon (falco peregrinus), one specimen of this bird obtained here in 1837.
Hobby (falco subluteo), several noticed.
Kestrel (falco tinnunculus), common.
Sparrowhawke (accipiter Nisus), occasionally.
Long-eared Owl (otus vulgaris), rare.
Short-eared „ (otus brachyotus), common.
Barn „ (Strux flammea), ditto.
Tawny „ (Syrnuim stridula), rare.
Red-backed Shrike (Lanuis collurio), occasionally.
Stone Chat (Saxicola rubicola), common where furze abounds.
Whin Chat (Saxicola rubetra), ditto.
Nightingale (Philomela luscinia), occasionally.
Wood Warbler (Silvia sibilatrix), several obtained.
Golden-crested Wren (regulus cristalus), common.
Willow Warbler (Silvia trochilus), ditto.
Chiffchaff (Silvia hippolais), ditto.
Grey Wagtail (motacilla borula), frequently observed.
Ray's Wagtail („ fluva), ditto.
Cole Tit (Parus uter), common.
Marsh Tit (Parus palustris), common.
Long-tailed Tit (Parus caudatus), ditto.
Bullfinch (Pyrrhula vulgaris), ditto.
Bramblefinch (fringilla montifringilla), several obtained.
Hawfinch (coccothraustes vulgaris), ditto.
Meadow Pipit (authus pratensis), common.
Crossbill (Loxia curvirostra), a few of these birds were obtained about eight years ago from some fir trees in the neighbourhood.
Jay (Garrulus glaudarius), common.
Magpie (Pica caudata), ditto.
Hooded Crow (corvus cornix), several obtained.
Green Woodpecker (picus vividis), occasionally.
Great Spotted Woodpecker (picus major), a few of these birds obtained every winter and spring.
Less Spotted Woodpecker (picus minor), ditto.
Nuthatch (Sitta Europæa), common in spring.
Wryneck (Yunx torquilla), ditto.
Cuckoo (Cuculus canorus), ditto.
Kingfisher (Alcedo ispida), common.
Nightjar (Caprimulgus Europæus), ditto.
Turtle Dove (Columba turtur), several.
Heron (ardea cinerea), common.
Woodcock (scolopax rusticola), occasionally.
Common Snipe (scolopax gallingo), common.
Jack Snipe (scolopax gallinula), ditto.
Land Rail (crex pratensis), several met with.
Water Rail (rallus aquaticus), ditto.
Sclavonian Grebe (podiceps cornutus), one specimen.
Little Grebe (podiceps minor), common.
Cormorant (Phalacrocorax carbo), one specimen at Wanstead Park.

ORNITHOLOGIST.

Leytonstone, March 18, 1867.

AIDS TO EGG-COLLECTING. — In collecting eggs the three chief points to be observed are—Identification, Authenticity, and Preservation ; for the better these are established the more valuable the egg is.

Of the first, to ascertain what kind any egg is, it is best to apply to some experienced oologist, to any public collection of eggs, or to some work on eggs. In these cases it will be a great help to know also something about the nest, its situation, &c., and notice should always be taken of any circumstance connected with them. Every nest taken should be recorded in a notebook.

This plan will also be very useful in establishing the authenticity of eggs. On getting them home, if the egg is large enough, it is best to mark on it with ink its kind, if liked where it was taken, and the date—in three lines. If it is small this may be done on paper, and then gummed on. If similar eggs are taken on the same day as owls' and ringdoves', a small pencil-mark is the safest method of preventing their being mixed.

The preservation of eggs includes blowing, conveying them home, and mounting them. There are many ways of performing the first of these operations, (which all dread) a hole to be made in the shell, this may be done in many ways. The country boy takes a thorn out of the hedge, or uses a pin or needle ; but the egg-collector wants something that will make a hole any size and always circular ; sail-makers' needles are very good and cheap, but the most effective thing is a small drill, or bar of steel, round, and having at one end several faces (mine has 8) coming to a point, which is used by being twirled between the finger and thumb.

The first and commonest method of blowing an egg is by making a hole in each end and blowing through; except making the holes at opposite sides, which is the second method: this is, I think, the worst way there is. The third is to make a hole in the small end, and another in the larger diameter; this shows even when the eggs are mounted. The fourth is the same, but that one hole is made in the large end which does not show when mounted; but still it disfigures the egg much more than the fifth, which is, I think, the first good one. In blowing a curlew, for instance, by this method, I should make a hole in the greatest diameter, and another in a line with it and two-thirds of the distance between it and the small end. In all these methods one of the holes can be very small. I have a goose's egg blown by the fifth way, where the small hole will just admit a pin, and the large hole is less than one-fifth inch diameter.

In the next methods a blowpipe with as small a nozzle as can be had (very good ones, half brass and half tin, can be had for 6d.), or what chemists call a pipette, and which can also be had for 4d. or 6d., is necessary, as only one hole is made in the egg, into which the end of the blowpipe or pipette is inserted, and by blowing or sucking the contents are forced out, or into the bulb of the pipette. There are also some methods of cleaning eggs when they have been sat on, entailing the use of several instruments, with which I am not acquainted.

Eggs are conveyed in safety by being placed in boxes lined with and having some loose cotton wool in them. For long journeys pack each egg separately in a piece of wool, and never send them loose in bran or sawdust or they will be broken.

In mounting eggs and forming a collection, they may either be stuck on cardboard or laid in cotton wool, and each kind labelled. Complete lists of British birds for this purpose can be had at Mr. J. Gardener's, 195, Oxford-street, London. I have been trying some experiments in mounting eggs in plaster of Paris, but without enough success to enable me to recommend it.

Any one who will send any hints on mounting or any methods of blowing birds' eggs (through this paper) will greatly oblige

KELLICK.

Smoke from a Lamp.—In reply to the query of "E. S.," anent the lamp, the following considerations will, I think, explain the phenomenon to which he refers:—

In all burning lamps, candles, &c., there is a column of heated air, &c. (the products of combustion) rising with considerable velocity through the chimney-glass; added to which there is a variable quantity of unconsumed carbonaceous matter, which in low temperatures is recognised as smoke. This column of heated matter on leaving the mouth of the chimney is met and resisted by the mass of colder air outside (above and around it), and is thereby affected in two ways: first, mechanically, by simple pressure or resistance which tends to check and divert the upward hot current; and secondly, chemically, by abstracting heat from the rising mass of vapour, and causing it thereby to become denser, more visible, or in simple language more smoke-like. Now this takes place in all similar cases of combustion, and is in all (in theory) equally evident; but the reason the phenomenon is not perceived under ordinary circumstances is this: one effect of this mingling of the cold and hot airs is to cause the air (as a medium of light) to be unable to convey a perfectly clear and steady impression of objects seen through it; and as the background (being the distant wall or ceiling) is not usually of a character to allow us to notice the distortion, it is only when we place a mirror or something analogous (as a background) that we are enabled to detect it: the face of the mirror being smooth and bright enables us by contrast to see the smoke and heated currents of air rise in front of it. This explanation will, I hope, prove satisfactory both to "E. S." and to your scientific readers generally. I hope I have made myself understood. I have tried the experiment with a moderator lamp, but did not perceive the phenomenon. Perhaps the combustion was too perfect to allow enough smoke to be formed.

W. H. A.

PIED WAGTAIL.—Two correspondents of *Land and Water* speak of the pugnacity of the pied wagtail, which we quote:—

"The snow was on the ground, the frost was severe, and a flock of chaffinches and greenfinches had congregated on a small spot of ground where some crumbs and grains had been recently thrown down. Three pied wagtails made their appearance amongst the flock of finches, and most vigorously attacked them whilst feeding, and one wagtail especially flew at a chaffinch which had perched on the handle of a wheelbarrow, which was standing near, and knocked it completely off. This was repeated several times on the chaffinch attempting to regain his post."

The other account says: "During the severe frost and snow we always threw crumbs out before our breakfast-room windows, which soon attracted a goodly number of sparrows, chaffinches, robins, and a thrush. They were not, however, allowed long to eat their meal in peace, for, almost immediately, a female pied wagtail (*Motacilla alba*, Linn.) popped in and sent them flying in every direction. The curious part remains to be told, for, having satisfied her own hunger, she placed herself in the midst of the largest heap, and, like the dog in the manger, drove off every bird that attempted to pick up a stray morsel."

THE WREN.—I have observed great differences in the formation of the nest of this little bird. One I found was like a tube built into the ground at the foot of a bush of broom, and another was completely round, with a small opening to allow the occupant to pass in and out. It was built beneath a bank of sand; and as I approached, the wren flew out. Can any one inform me whether this was a different species, or the same bird accommodating itself to circumstances? FOX.

BEES.—Having last autumn failed in attempting to take honey from a hive of bees, by means of fumigating with fungus, I am anxious to learn how. Could any of your readers oblige me with an account and full particulars how to do it? I used Neighbour's fumigator (No. 12). The hive was full of bees, but only the bottom ones seemed to be affected by the smoke. A. B.

EARLY MOORHEN'S NEST.—A correspondent of the *Field* says: "A moorhen has already constructed her nest on the surface of a small pond at the foot of the ancient elms which the rooks love to frequent, and on the 5th of March had laid six eggs. Is she not very early?"

NEW PLANT CLUB.—Many of my flower-loving lady friends have formed a club or association, with rules hitherto strictly abided by, through which we are enabled to obtain many novelties that otherwise, from the high prices they bear, we could not hope to possess; and since it has proved so eminently successful, I am authorised to communicate with such other ladies as may desire to proceed on the same footing as ourselves, but I beg leave to observe, it will be left to our option to forward our rules only where we can, through the means of friends, ascertain from whence and from whom the applications proceed. I have only to remark that by the combination of friends we are enabled to procure such plants and seeds as are most desirable, and which by propagation and division we can all participate in; and thus we all become possessed of new and choice varieties at very trifling cost, some of our gardeners being, I should say, good propagators, and soon getting up the required number of plants. Should any of your numerous friends feel desirous of following our example, they will please apply through you.—*Isabella, Salisbury.*

[The above appeared in the *Gardeners' Chronicle*, March 16th. Should any of our readers feel disposed to interest themselves they will please direct to the Editor of the *Gardeners' Chronicle*, 41, Wellington-street, Strand.]

STATE OF THE WEATHER NEAR LONDON.

Feb. and March.	Moon's Age.	Barometer.		Temperature.					Wind	Rain.	Remarks.
				Of the Air.			of the Earth				
		Max.	Min.	Max	Min	Mean	1 foot deep	2 feet deep			
Thurs. 14	10	30.281	30.194	54	34	44.0	48	44	E.	.00	Foggy; hazy; very fine at night.
Friday 15	11	29.998	29.710	58	45	51.5	47	44	S.E.	.10	Fine; very fine; cloudy; rain.
Satur. 16	12	29.774	29.719	59	40	49.5	49	46	S.W.	.38	Rain; fine; heavy rain at night.
Sunday 17	13	30.138	29.879	53	36	44.5	50	46	E.	.00	Foggy and mild; fine; cloudy.
Mon. 18	●	30.412	30.061	48	42	45.0	49	46	E.	.00	Dense fog; hazy; overcast at night.
Tues. 19	15	30.368	30.289	54	45	49.5	49	46	S.E.	.00	Hazy and damp; fine; overcast and mild.
Wed. 20	16	30.479	30.407	58	41	49.5	49	46	W.	.00	Hazy; fine; slightly overcast and fine at night.
Thurs. 21	17	30.485	30.428	57	37	47.0	49	46	S.W.	.00	Uniformly overcast; overcast throughout.
Friday 22	18	30.412	30.328	52	36	44.0	49	46	S.W.	.00	Overcast; densely overcast at night.
Satur. 23	19	30.456	30.406	56	30	43.0	49	46	N.W.	.00	Fine throughout; mild at night.
Sunday 24	20	30.216	30.133	54	35	44.5	48	46	S.W.	.00	Densely overcast; fine throughout.
Mon. 25	21	30.146	29.965	50	38	44.0	48	45	W.	.01	Fine; very fine; densely overcast; rain.
Tues. 26	☾	29.990	29.960	45	35	40.0	47	45	W.	.04	Drizzly; fine; overcast.
Wed. 27	23	30.017	29.990	44	32	38.0	47	45	N.E.	.00	Hazy clouds; dry haze; overcast at night.
Thurs. 28	24	30.344	30.162	45	23	34.0	46	45	E.	.00	Cold haze; dry, slight haze; very fine; frosty.
Friday 1	25	30.565	30.472	45	28	36.5	44	44	N.E.	.00	Partially overcast; dusky clouds; overcast.
Satur. 2	26	30.687	30.655	40	25	32.5	43	43	N.E.	.00	Foggy; cold hazy clouds, with dry easterly winds.
Sunday 3	27	30.666	30.518	45	30	37.5	42	42	N.E.	.01	Dry and frosty; fine; overcast; slight rain at night.
Mon. 4	28	30.438	30.233	47	33	40.0	42	42	N.E.	.00	Hazy and cold; fine, but cold and dry; overcast.
Tues. 5	29	30.125	29.974	49	25	37.0	41	42	N.E.	.00	Densely overcast; fine; very fine; slight frost at night.
Wed. 6	●	29.810	29.657	42	27	34.5	42	42	N.E.	.00	Overcast; sky of gloomy dusky hue; sun eclipsed, at times distinctly visible; clouds in strata, the lower floating dark and low; the upper stationary.
Thurs. 7	1	29.593	29.583	37	28	32.5	42	42	N.E.	.00	Hazy; snow in broad flakes; snow at night.
Friday 8	2	29.570	29.486	40	26	33.0	42	41	N.E.	.08	Snowing in broad flakes; cloudy and cold; overcast.
Satur. 9	3	29.518	29.202	44	35	39.5	45	41	N.E.	.46	Slight haze; boisterous; heavy rain at night.
Sunday 10	4	29.456	29.121	45	33	39.0	42	42	N.E.	.03	Hazy and damp; drizzling rain; densely overcast at night.
Mon. 11	5	29.682	29.561	41	32	36.5	42	42	N.E.	.04	Hazy throughout; drizzly rain at night.
Tues. 12	6	29.741	29.646	39	27	33.0	42	42	N.E.	.06	Sleet; boisterous; overcast at night.
Wed. 13	☽	29.891	29.633	34	30	32.0	40	41	E.	.40	Frosty; cold and overcast; snow at night.

THE NATURALIST IN THE CHINA SEAS.

ON Monday morning, April 30th last, Capt. Bullock and I, with Mr. Sutton, chief engineer of the SERPENT, visited the island (Pratas) two hours' pull from the ship; and I spent the whole day in exploring its character and natural history features. It is formed entirely of coarse coral sand or debris, generally shelving gradually, but in some parts having a steep bank, about 3 feet high. The interior is rough and hilly from accumulations of similar white sand blown up from the shore, and so overgrown is it with shrubs as to be in some parts almost impenetrable, though the soil might be supposed to be anything but favourable to vegetable growth, nothing but sand being anywhere visible, and that of the coarsest and loosest description. The bushes in some places approach very near the sea, and between them and the water's edge various flowers not unfrequently peep out from the inhospitable soil, including a patentilla, an anemone, a plantago, and some grasses. On the west side of the island is a deep indentation into which the sea enters, forming a shallow lagoon or bay, on the banks of which the vegetation assumes quite a park-like aspect, bushes and even small trees with spreading branches springing forth close to the ground producing a scene of great luxuriance and some beauty. Amongst the bushes immense orthopterous insects (grasshoppers) flew, about exhibiting a deep red underwing, and looking very much like small birds. To the shrubs also were attached numerous geometric webs, which were occupied by a species of spider belonging to the division *Acrosoma*, having a squareish abdomen, from the upper surface of which projected several spike-like processes. This was the only species of spider which came under my notice, and in its web there appeared to be as often another spider of the same species, as any other kind of insect, the paucity of insect life on the island apparently driving them to cannibalism. A moth whose expanse of wing was about an inch, and having small red and black spots upon the wing, was pretty numerous, and appeared to be the only lepidopterous insect, with the exception of a large clear-winged species, which was captured but unfortunately escaped again. These, with some ants and a few carrion beetles, constituted the insect fauna as far as could be determined during our single visit.

Among the coral debris upon the beach were numerous masses of various sizes, consisting of rolled Astræas madrepores, etc., and mingled with them were fragments of shells of a great many species of consus, cypræa, turbo, ponna, hippopus, &c., but none of them entire. Innumerable little hermits (paguri and cœnobitæ) occupied the deserted shells of noticæ and neritinæ, and larger ones those of good-sized turbines; but I saw no live shells upon the beach except a few insignificant ones, such as litorinæ and purpuræ; nor, though the water was bright and clear and I waded out as far as I could go, could I anywhere see any traces of annelids or echinoderms. The harder parts of the sand were harrowed with deep holes of various sizes from which emerged from time to time wary and swift-footed crab (ocypoda) which scuttled nimbly down to the sea upon the first sign of approaching footsteps, and appeared to be aware of us at least at fifty yards distance. Nor was it easy to capture a specimen, for while on the one hand they never made the mistake of running *away from* the sea, on the other hand, if cut off, they fled so quickly and *doubled* so nimbly, suddenly running the opposite way without the clumsy process of turning round, that they afforded great amusement and not a little exercise and exertion.

The sea in the neighbourhood of the Pratas Island has a very variegated appearance, from the alternative of bare white sandy bottom with patches of ulva and zostera, both of which are very abundant. The ulva is a very beautiful reticulated species, and the zostera leaves float about in all directions, and in all stages of decay, generally bearing upon them minute dendritic polyzoa, lurnilites, spirorbis, &c., with which the towing net from the ship was replenished. Besides the ulva, I obtained several other species of seaweed washed up on the beach, and conspicuous among them a species of padina, very abundant everywhere in these seas, and a sargassum.

Although some classes of animals were poorly represented upon Pratas Island, there were plenty of birds, and of several species; bush, sea, and land birds. A buzzard I noticed several times, but it was too wary to allow me to come within gunshot, although it offered a tantalizing mark just out of range. I observed a very handsome shrike, with an ash coloured head and black moustache; the blue-jackets reported that they had seen a canary, and I afterward saw myself a yellowish bird, resembling the English siskin, which was, probably, the bird they had noticed. Another bird, about the size of a blackbird, was of a glossy metallic blue above, and fawn coloured beneath; its stomach contained the elytra of beetles. A fifth species presented all the appearance of a veritable blackbird, but I could not get near enough to examine it closely. A species of swallow, with glossy bluish back, chesnut neck, and with a speckled fawn colour underneath, was flying about in considerable numbers ; and, on the banks of the shallow inlet, I saw a bright coloured kingfisher, very similar, in appearance and size, to our own species. There were also, some small birds which crossed our path from time to time with the jerking flight and the chirrup of the hard billed passeres. Large flocks of Tringas, (sandpipers) of at least two species, were visible on the sandy flats of the inlet which were left uncovered in the afternoon, and also upon some parts of the seaward shore of the island, where it was inclined to be soft and marshy. There was also two species of plover ; the one of a reddish brown colour, with orange red legs, and a godwit, (Limosa) speckled grey and brown, with greenish legs and a remarkable beak. A large rapacious looking bird, which came sailing majestically within gunshot, was brought down, and turned out to be the frigate bird (Tachypetes aquilus), a bird confined to tropical regions, but having a wide range throughout them, being not uncommon both in the Atlantic and Pacific Oceans. When it fell, a strong guano smell pervaded it, which was very disagreeable. I measured its expanse of wing, which proved to be nearly seven feet from tip to tip ; and on opening its stomach I found, in a partially digested state, three large flying fishes and two squid. Small flocks of a pretty species of white egret frequently flew along the shore, and indeed, with gannets, made their appearance about the ship immediately upon her anchoring off the shoal. I shot one from the ship for examination, and found it to be twenty inches long from tip of beak to end of tail, and of a pure white colour, with the exception of a few orange feathers over the base of the beak, which formed a sort of crest, bill yellow, and legs greenish brown. It was not provided with any of those special feathers which adorn our British species ; the stomach contained a few remains of beetles.

But the dominant and characteristic bird of Pratas Island, is the gannet. These birds measure 4ft. 10in. from tip to tip of wing, and 2ft. 9in. total length from beak to tail, which is wedge-shaped. The head, neck, back and tail, are fuscous ; breast and belly white ; legs and feet yellow, and completely webbed. They are common birds on most of these islands, and are well known to seamen. They fly heavily, and usually low, fearlessly approaching within gunshot and even stonesthrow, and some of the men amused themselves with throwing lumps of coral at them as they flew by, the same bird returning again and again at the risk of being knocked down.

A walk through the interior of the island among the shrubs and bushes revealed to me the domestic economy of these birds. In the open places and under the shelter of the bushes, the mother gannets were sitting upon their nests and eggs. The nests were mere hollows in the coral sand strewn with a few bits of grass, with some admixture of feathers, and perhaps a bit of seaweed, forming at best a very rude cradle in which were deposited two eggs. These eggs were about the size of goose eggs, white, with a suspicion of a blue tinge, not smooth and glossy like hens' eggs, but more or less scratched as though the scratches were made when the external coat was soft and had afterwards dried, preserving the marks. One nest contained four eggs. The poor bird sitting upon this nest would show symptoms of uneasiness as I approached, pecking the ground or coarse grass fiercely with its long straight beak, but did not offer to quit the nest until I was within two or three yards of it or even less. Then placing the end of its bill upon the ground, with a gulping effort it vomited up its meal, depositing it beside the nest, and floundering forward took wing and rose into the air. This was the proceeding at nearly everyone of the hundreds of nests which I disturbed. It was evident that the birds had just gorged themselves with food and then sat upon their eggs (unless indeed the mate had brought them food, a circumstance which I did not see myself) and that they were unable to raise themselves off the ground until they had got rid of the superfluous weight in their stomachs. On examining the vomited food, I found it to consist invariably of flying fish generally of a large size and usually but slightly digested. There were sometimes six or seven of these fish, in other instances only three or four, and in two or three cases a squid or two intermixed with them. But what numbers of flying fish must exist in the neighbourhood to afford such a daily supply to so large a number of birds, and yet we did not see a trace of flying fishes about the island, and might otherwise have supposed there were none. Meanwhile the gannets formed a thick cloud over head, the noise of whose screams and the rustling of whose wings formed a wild accompaniment of sounds. They flew so close over head that I could have knocked them down with a stick in any numbers, and was obliged to wave my gun about as I walked along, in order to keep them from carrying away my hat. By degrees the birds rose higher, and those I had disturbed returned to their nests as soon as I had passed a few yards.—*The Quarterly Journal of Science, London.* JOHN CHURCHILL & SONS.

ROOKS.

THE Rook (Corvus frugilegus), with perhaps one exception, is more numerous than any bird in our district ; that exception is the jackdaw, which, though it does not assemble in immense flocks like the rook, yet, I think, equals it in numbers. Rookeries, great and small, are scattered all over our neighbourhood, those in Thoresby Park being the largest and most thickly populated. One of these, in a grove of Scotch fir and oak about a quarter of a mile from the mansion is of immense extent, and its occupants must be counted by thousands.

I have seen them in an evening when they were returning to their nests quite darken the air with their flight, and on one or two occasions, when the turf has been infested more than usual with the larvæ of the cockchafer, they have literally blackened a patch of ground about a quarter of a mile square; and never shall I forget the amazement with which a relative of mine, fresh from a town residence, gazed on their countless numbers.

Their partiality for the grub of the cockchafer is productive of the most beneficial results. But I have seen long patches of sward in the forests and parks so thoroughly and uniformly dug up in their search for them that it was greensward no longer; not a patch as large as the hand had escaped being uprooted.

I do not agree with the opinion so commonly expressed, that the bare space around the base of the bill of the rook is produced by its habit of grubbing in the ground; I have watched them very closely when they have been engaged in upturning the turf as I have described, and I never saw the bill plunged beyond its length. Even when they are searching the newly-ploughed ground, when they approach so closely, I never observed any action which could produce the abraded appearance. I admit it is very natural to attribute it to such a cause; but is it not a singular fact telling strongly against this theory, that in the extent of this bare skin there should be no appreciable difference in one bird over another, but all are equally denuded? Surely, if it was produced by digging, some variation in this would be noticeable, but I never saw such; the jackdaw, too, is as great a digger as the rook, and has a shorter bill, and yet the base is clothed with feathers which bear no trace of injury from such a cause.

Though naturally insect feeders, yet there are times when, pressed by hunger, rooks levy their contributions on the newly-springing corn, and in hard winters they will even frequent stack-yards. They are very partial to potatoes, at least they are much addicted to digging up and carrying off those freshly planted, but it is chiefly at the time when their young are clamorous for food, "when there is little to earn and many to keep;" indeed they often suffer greatly from want at this time of the year. Macgillivry doubts the assertion that the rook pilfers freshly-planted potato sets, but I have seen them do so hundreds of times.

Though in our neighbourhood the corn is always tended by boys, from the time of sowing until it is well out of the ground, in order to drive off the rooks, who would otherwise commit great havoc, yet I think the cultivators of the land have a pretty correct idea that, on the whole, the labours of these birds are productive of great benefit to the crops, and no greater destruction is made than of an occasional one who, with wings extended by two split sticks, is placed *in terrorem* in the centre of a corn or potato field; and a very effectual scarecrow he makes —his constrained attitude is understood at a glance by his wary brethren, and they need no other hint. In some parts of the country the agriculturists are not so conversant with the habits of the rook, and I know that in one locality in an eastern county a large rookery was destroyed under the belief of the farmers that its inhabitants were hostile to their interests, and consumed a large quantity of corn. But mark the result. Two years passed away, and the farmers congratulated themselves on being rid of their winged foes, little thinking that they had other foes in their place whose approach was more difficult to detect. In the second year many fields of wheat suffered from wireworm; but in the third their ravages had become so general throughout the district as to occasion serious alarm. Little could be done to suppress their numbers until the rooks were again thought of, and the evil was traced to its true course. The rookery was permitted to be re-established by the return of many who had escaped the massacre, and who still cherished a partiality for their native trees, but who had hitherto been continually driven off. Their rapidly increasing numbers soon reduced the insect pest, leading the farmers to acknowledge the error into which they had fallen, and hence forth to look upon the rook as a friend instead of an enemy.

When rooks are feeding they always station several of their number as sentinels, and very faithful they are in sounding the alarm on the approach of a foe; they are not only vigilant in their watch, but evince a large amount of sagacity, an amusing instance of which was communicated to me by a friend on whose statement I can rely, and who witnessed the occurrence.

A very large field had been sown with wheat, and in the centre a little hut had been erected to shelter the boy who had to tend the field, and to enable him to reach all parts of it. A gentleman who wished to obtain a few birds to hang up in his own fields thought this would be a good opportunity of procuring them, for they thronged around in great numbers, and kept the boy actively employed to drive them off. So taking his gun, he went into the hut accompanied by the boy, and through some holes in the sides prepared to pour a volley on the invaders. But he reckoned without his host. The watchful sentinels seemed instinctively to divine the plot, their warning "caw" was loudly uttered, and the presence of the ambushed foe made known. They circled round and round and settled in the surrounding field, but not one of them would trust themselves within gunshot of the hut. For some time the gentleman waited in vain, and then sent the boy away with directions to walk straight out of the field; but this ruse did not succeed. The rooks still refused to "come and be killed," so he left the hut and followed the boy, but no sooner had he gone out of the gate of the field than the sentinels gave the signal, and scores of their fellows at once descended and commenced their foray. The sportsman determined not to be outwitted in this way, so he immediately took two persons with him into the hut and resumed his ambush, the rooks having taken flight on his reappearance. After a short time had elapsed he sent one of the persons away; and after another interval the second, expecting that as soon as they both left the field the rooks would return; but he was again doomed to disappointment; "beware" cawed the sentinels in the most sonorous tone, and none ventured to disregard the warning. Determined still further to test their powers of numeration, he again left the hut and returned with three persons, all four entering together. Again, one by one, the companions were sent away, and the plan was at last crowned with success; the rooks could count as far as three, but four was beyond their powers, and no sooner had the third person left the field than they hurried to the spoil, but only, alas! to leave two of their number dead on the field, victims to the want of a knowledge of numeration.

I met with an interesting account of the sagacity of the rook in the *Dundee Courier* a few years since. Its truthfulness was vouched for by the gentleman who communicated it, and by the editor:—On Saturday week a very curious scene occurred in the colony of crows on the South Inch, Perth. One of the black denizens had been laboriously occupied in conveying sticks from the opposite side of the river, wherewith to build his nest, when something seemed to strike him that he was making no progress in his erection, and that he was the victim of some thievish neighbour. That his suspicions were correct he soon discovered, and evidently adopted the following plan to detect the culprit. He set off apparently to cross the river, and kept his usual way, but on reaching the island he suddenly wheeled round, and sweeping behind the lime sheds he reached his nest just in time to catch the suspected rogue in the very act of robbing him of a stick. A fierce engagement ensued, lasting several minutes, when the thief clearly having the worst of the fight, was compelled to render justice to his injured neighbour by restoring his stolen property, as for nearly half an hour after the latter was seen to carry stick after stick from the other's nest without any molestation, and apply them to his own.

I can quite give credit to this anecdote, for I have known two similar cases, in which one rook was detected stealing sticks from another; in both instances, however, the punishment was inflicted by more than the injured bird, and in one case with such severity that the offender's life was forfeited. I have more than once seen a rook chased from a rookery by a number of its inhabitants, but whether the hostility was shown because it was a stranger or a criminal I could not discover.

Lord Campbell, in his "Lives of the Chancellors," says that "in Scotland the crows, who take such good care to keep out of gunshot on every 'lawful day,' on the Sabbath come close up to the houses, and seek their food within a few yards of the farmer and his men, discovering the occurrence of the sacred day from the ringing of the bells and the discontinuance of labour in the fields, and knowing that while it lasts they are safe."

I am not aware whether rooks ever indulge in eating eggs, but I once saw a pair on the 4th of June actively engaged for some time in chasing a pair of green plovers in a field on the verge of the forest. They were evidently bent on driving them away from a particular spot, which the plovers seemed as determined not to leave, and from their pertinacity I concluded that their nest was thereabouts, and that they suspected the rooks of a wish to plunder it; I must say the conduct of the latter was very suspicious.

The rook is occasionally subject to variations of plumage, and the saying as "black as a crow" is not always applicable. In March, 1860, one was killed near us which was uniformly speckled all over with white.—*Field*, March 30th.

STAR SHOWERS.

FROM the interior richness and brilliancy of the recent star-shower as compared with that described by Humboldt and others in 1799 and 1833, it has been suggested by M. Coulvier Gravier that the late display is but the precursor to the fuller and really periodical phenomenon which may be expected at the same period of the current year. Be this as it may, the law of periodicity has been sufficiently established to remove all doubt from the theory that these flights of meteors are due to the existence of a ring or rings of cosmical matter revolving round the sun. As early as the year 1835, Arago was led to enunciate the belief that there exists a zone composed of millions of small planetary bodies with the sun for their centre, whose orbit cuts the plane of the ecliptic at about the point which the earth annually occupies between the 10th and 14th of November. The period from the 10th to the 14th of August was first noted by M. Quetelet, of Brussels, and has been determined by Mr. Alexander Herschel to be one of eight years. It is now supposed by German, English, and American observers, that star-showers recur, though less regularly, in January, twice in April, in July, October, and December. But, earlier than all, Cassini had stated his theory of the zodiacal light, which referred that phenomenon to a ring of nebulous or gaseous matter, or of innumerable small planetary bodies, revolving round the sun. And he went so far as to suggest that the fall of meteors might be connected with the passage of our planet through this ring. There have, indeed, been some who, regarding the zodiacal light as a ring of the same sort of matter, have assigned it to the earth, instead of the sun, as its centre. But this hypothesis may be set aside by the most simple geometrical consideration. The form of the luminous cone is unmistakably such as, if prolonged, would describe an ellipse with the sun in one of its foci. And, notwithstanding the opposition of Olbers, the general opinion of astronomers has gone with Olmsted and Biot in definitively connecting this phenomenon with the November meteors, of which the radiant point is in Leo. The discovery of additional radiant points in Perseus, Hercules, and other constellations, may fairly be taken to indicate additional rings inclined at different angles with the ecliptic between the orbits of Venus and Mars. The nodes of the August ring seem to be stationary, while those of November have a direct proper motion retarding the star-shower year after year. It appears probable that the matter of which these rings are composed is by no means equally diffused in space, but may be scattered in sporadic groups or masses, more or less dense at different portions of their orbits. The so-called planetoids, which have been discovered to the number of seventy and more, may not improbably be taken to represent larger members of a series such as this. Mr. Herschel even goes so far as to consider it certain that not only periodical meteors, but ordinary shooting-stars, such as may be seen at any time of the year upon clear nights, belong to rings having a determinate orbit; and not fewer than fifty-six such rings he believes to be as well determined as those of August and November.

Besides this, which may be termed the "planetary" hypothesis, there has also been suggested the "satellite" theory of meteors. According to the latter view, we are to suppose a flattened ring or rings circling the equatorial regions of the earth, analogous to the system of Saturn. We have seen that no such theory as this can be connected with the zodiacal light. But there is nothing to prevent its being accepted on grounds of its own, and it may well takes its place in perfect harmony with the other. Both the sun and the earth, that is, may have their hosts of indefinitely smaller bodies. M. Petit, of Toulouse, has in fact satisfied himself of the existence of one such revolving body, having an orbit round the earth of three hours and a half, at a mean distance of 5,000 miles from the earth's surface. To the same category we may, perhaps, refer the dark spots which are occasionally seen to cross the sun's disk. On the 4th of October last a dark mass was observed by M. Heis to traverse the sun through eleven degrees of right ascension. A similar spot was seen by M. Aristide Coumbary at Constantinople, on the 8th of May, 1865, to cross the sun's lower limb (reversed) in forty-eight minutes. And the astronomer Meissier, on the 17th of June, 1779, as reported by Arago, witnessed, for about five minutes, a "prodigious number of black points passing across the sun." May we not, in fact, consider our magnificent secondary, the moon, as but the chief of a series of meteoroid masses of this kind? Saturn, we know, in addition to his belts, has eight attendant moons or satellites. Our planet, less richly endowed, has but one on a like scale of magnificence. Conceiving the planetary system at large to have been condensed and solidified from the cooling down of the sun's atmosphere, we may suppose certain minor masses or particles of the same cosmical matter to have been left out from the major masses of the earth and moon, and to have been scattered on the path along which those bodies held their way. We are thus led to the conclusion, graphically put by Dr. Phipson, that our earth circulates round the sun "in or near a continuous cloud of its own dust." On the supposition that the largest aerolites fall in the day-time, while detonating bolides or fire-balls occur about the period of sunset, Mr. Herschel has conjectured that the larger fragments have their orbit inside that of the earth, and that the size of these bodies gradually decreases, the meteoric dust or shooting stars lying beyond the earth's orbit, so as to be seen only by night. Seen thus from some imaginary point in space beyond the earth's orbit, the spectacle we might conceive our system to exhibit would be that of a composite group—earth, moon, and meteoric rings—moving round the sun at about the same mean distance as the sun's ring or rings before descrebed. Its orbit being one of greater eccentricity, our system would be seen annually to draw near, and possibly every thirty-three years to break through, one at least of the solar rings. Thus the regularly recurring flights of meteors would be accounted for. At the same time, the earth's superior attraction for the moment might be supposed to steal away, so to say, sundry of the sun's tributaries, and to attach thenceforth these stragglers to her own train. From the mass thus accumulated round her central regions, occasional bodies, jostling each other in their flight, or getting entangled in the earth's atmosphere, would be precipitated in those solid forms which are accumulating so rapidly on the shelves of our museums. With this view concurs the fact of meteoric falls being observed to be more frequent towards the tropics than towards the poles.—*Saturday Review*, *April* 6.

THE DAISY.

THIS very humble evergreen herbaceous plant, the *Bellis perennis* of botanists (from *bellus*, pretty), was the delight of my boyhood; for I cultivated the Daisy for an edging, when my father alloted me a patch of ground about 12 feet by 6, for floriculture. As I advanced in years I found to my cost that this friend of my youth was a troublesome lawn weed, and that it had been rightly named perennial, for it proved remarkably tenacious of life. Every gardener has been tormented with its fine healthy appearance, in full bloom all over the lawn in little more than a day after mowing; and, as the following quaint epitaph from an Irish churchyard indicates, it is destined to get the upper hand at last :—

> "Here I'm arrived, and my burden is aises,
> With the point of my nose, and the tips of my toes,
> Turned up to the roots of the Daisies."

This pretty composite flower, with its coronet of rosy florets, seems as if its involurated head had been brow-bound with a reversible garland, for when the wild daisy is expecting rain or heavy dews, we find it forming an elegant bud, beautifully tipped with pink ; but when the sun shines, and the sky is serene, it shows the white star spreading from its golden centre, and in this state, wherever the highly-kept lawn is respected, the gaudy little weed is sure to be detested. In botanical works the daisy is said to flower from March until August. I saw some in flower in January this year, and the previous weather had certainly not been by any means forcing—in fact, the daisy was only a few days behind the snowdrop in showing blossoms, and we may safely reckon upon its blooming in favoured localities until the end of October.

The large double garden variety not being a perfect flower, but a very beautiful transformation, is more shy of blooming, and seldom shows fine flower buds excepting in spring. The double quilled kinds seem to have carried the transformation still further, and piped each floret, so that the style and character of the original type become altogether changed. Under ordinary circumstances these double flowers are barren, and consequently have to be propagated by division of the roots. There is a proliferous kind called the Hen-and-Chicken Daisy, which forms lateral flower,heads around the parent head—a mere oddity, and by no means ornamental like the garden varieties above noted. The daisies have one very important point in a business point of view—they sell very well, having a good deal of decided character about them, and making pretty little presents for children ; but the daisy, as an ornamental flower, is not to be confounded with the lawn weed, nor with the Hen-and-Chicken varieties. There is a kind—*aucubæfolia*—having beautifully variegated leaves, and where the variegated leaf is required the plant is seldom allowed to flower, as the blossoms take away from the effect of the foliage.

In planting daisies do not be alarmed about dividing them, only take care that some little rootlets be attached to each crown. If planted for edgings, about six plants should go to the foot ; be careful to dip the roots of each plant into some rich mud, of about the consistency of thick paint, before planting ; and if planted in finely pulverised soil and watered they will not fail to grow, for the daisy is a sure cropper. I have mentioned this way of planting daisies for edgings for the sake of the veriest beginners in floriculture, who, like myself, may have to start with the fourth part of a perch of garden ground. Let no one cheat the child out of such a harmless hobby as this, for I speak from experience when I say that I found great happiness in that small spot of black earth. It is, however, to the oft-recurring little patch of daisies all along the sheltered border that I would particularly direct attention, for they are among the cheapest flowers we have, and never fail to bloom freely under very ordinary culture. In order to have them looking neat, let me advise that all the flower-heads should be constantly plucked off as they begin to tarnish in any way, either with soil from dashing rains, or from decay. It is surprising what newness of life will be imparted to pet plants by this slight attention. There is nothing either first or last in floriculture. The cedar on the lawn, and the daisy on the common, are limited according to the measure meted out to each.

It is quiet disheartening to a young cultivator to begin growing good flowers, as they are called, for if they suffer the least neglect, they are done for ; and there are a great many more bunglers in floriculture than it would be desirable to name. A few pence, however, well laid out on daisy plants will do more for a permanent display of neat and very showy spring flowers than can be had from any other genus that I know of. Daisies neatly dotted round a curve at distances of about six feet, or in straight lines at the same distance apart, will give the early-spring border a charm quite peculiar, as the flowers are so well thrown up above the foliage, and there is such a dense mass of flower-heads if the plants have been well fed.—Alex. Forsyth in *The Florist and Pomologist*, April.

INFUSORIA AND MYCELIUM.

The infusoria (so called from their occurrence in infusions of vegetable matter when exposed to the air) are found in enormous numbers in every stagnant pool, and form a large class of varied types of animal life; some possessing a complicated system of stomachs and digestive organs; others, again, being bags of jelly-like substance with an opening or mouth through which the food is taken up, whilst the simplest form of such beings as the amoeba, or protent animalcule, consists of a mass of clear jelly, possessing neither stomach nor mouth. Observed under the microscope, the amoeba may be seen gradually to move its gelatinous body into various shapes, and should it come into contact with the decaying vegetable or animal matter, which serves as its food, the jelly is seen to spread over and enclose the decaying particles, which then become digested as if the animal possessed a complete mouth and system of stomachs. Most of the infusoria, however, have funnel-shaped openings or mouths, and are covered by hairs or celiæ, by the vibration of which food is brought into the mouth, and the animal is enabled to swim about. These polygastric infusoria, as Owen tells us in Hunterian Lectures, "are the very type of the digestive function, assimilating and reorganising the decomposing particles of animal and vegetable matter with a hundred-stomach power. That low delight, the bliss supreme of the civilised gourmand, is given most liberally where it ought to be, to the creatures at the lowest grade of animality." The smallest of these infusoria, and those which make their appearance first in the vegetable decoctions exposed to the air are called *monads;* they appear, under the microscope, usually as mobile points, possessing, as a rule, a diameter of about $\frac{1}{50000}$ part of an inch. Lower still in the scale of animal life come the *vibrios;* these are jointed animalculæ, each individual consisting of a very thin filament which splits off from the parent. They possess neither head nor tail, nor do they show any trace of structure, and except that they exhibit a power of apparently voluntary ciliary locomotion, they might be classed amongst the vegetable world. These creatures are always present in infusions, and are distinguished as vibrios when existing in the pliable filaments, as bacteriums when the corpuscles are connected together by a thread-like, more or less, inflexible chain, and as spirillums when they have a corkscrew shape and move in a spiral direction. Some idea may be formed of the difficulty of making observations respecting the structure and habits of these creatures owing to their extremely minute size, when we learn from the observations of Ehrenberg that eight hundred thousand millions of these animalculæ may be contained in one cubic inch of water, and yet occupy but one-fourth of its space.

Doubts have been expressed by some of our leading microscopists even as to the animal nature of these organisms. Certain decided forms of vegetable life are well known to possess a power of ciliary locomotion, and it is in fact still an open question whether the organisms which are classed as monads, vibrios, and bacteriums do not often consist of the spores of plants. The mode of propagation and distribution of these minute creatures is thus well described by Professor Owen:—"The act of oviparous generation—that sending forth of countless ova through the fatal laceration or dissolution of the parent's body—is most commonly observed in the well-fed polygastria, which crowd together as their little ocean evaporates, and thus each leaves, by the last act of its life, the means of perpetuating and diffusing its species by thousands of fertile germs. When the once thickly tenanted pool is dried up, and its bottom converted into a layer of dust, these inconceivably minute and light ova will be raised with the dust by the first puff of wind, diffused through the atmosphere, and may there long remain suspended, forming perhaps their share of the particles which we see flickering in the sunbeam, ready to fall into any collection of water, beaten down by every summer shower into the streams or pools which receive, or may be formed, by such showers, and, by virtue of their tenacity of life, ready to develope themselves wherever they may find the requisite conditions for their existence."

The lowest forms of growth of the vegetable kingdom are the peculiar organisms which make their appearance in widely different situations, producing disastrous effects upon crops of every kind. To these microscopic fungi the botanical name of mycelium is given, but they are more generally known by the common names of mushroom spawn, mould, rust, smut and mildew. The material of which these several kinds of fungi are composed possess an extraordinary amount of vitality; it may be dried and kept for years, and even heated to the boiling point of water, and still, when again exposed to moisture and to a moderate temperature, it revives and grows. The edible part of the mushroom and visible portions of the larger fungi are, in reality, only the organs of fructification of the plant. They contain the seeds, or spores, consisting of millions of the most minute particles, which fall out when the plant is ripe, and are carried by the wind to far distant spots, there to form new mycelium and new spores. A beautiful natural photograph of the mushroom, or fungus, may be obtained from these sporules, as Sir John Herschel has shown, by allowing the ripe mushroom, having the stalk end off, to lie for twelve hours upon a clean glass plate; the spores then drop out from the radiating folds of the mushroom in which they are contained, and, adhering to the surface of the glass plate in the place upon which they fall, leave a most delicate and exact tracery of the plant. The same mode of propagation is found to exist among all fungi, whether microscopic or not, and of the latter class we now find no less than 2,479 distinct species enumerated in the "Index Fungorum Britannicorum."

It is the existence of sporules of these various species of fungi, floating about in the air, that gives rise to the common phenomenon of "mould," which we observe in bread or in cheese. The sporules fall upon the moist bread, find there circumstances to suit their growth, and gradually develope into a tree-like form bearing sporules, which in their turn are dropped, float in the air, and form the origin of a new fungoid colony. This particular fungus is termed by mycologists *Penicillium glancum*, and it possesses characters of as specific a kind as those of the edible mushroom. The number of distinct species of moulds already recognised is very large; they are generally parasitic; and cultivated plants of all kinds, and even the bodies of animals, are more or less subject to their ravages. No less than thirty species are known to infest plants of the corn tribe, whilst ten different fungi inhabit the potato and produce the dreaded disease. The vine disease and hop blight, the black rust on standing corn, and the mildew which rots cotton, cloth, and causes so much trouble to the merchant and manufacturer, as well as the green mould, which the epicure values on a Stilton cheese, are all produced by this fine microscopic fungoid dust which is constantly present in the air, and being of so minute a kind cannot be in any way excluded. It is rendered visible as motes in the sunbeam, and only requires to find a suitable position to sow itself and produce its kind.—*Edinburgh Review*, April, 1867.

ENCROACHMENT OF THE SEA.

In 1864. I published the following account in a "Sketch of the Geology of Norfolk," printed in White's *Gazetteer* of the County, page 180:—"It is very difficult to obtain precise and accurate information respecting the amount of land washed away in a given number of years. We, therefore, gladly avail ourselves of a communication on the subject by a very intelligent as well as interested observer, Mr. William Cubitt, of the Bacton Priory Farm. He states that, at Bacton, where he and his predecessors have carried on the business of coal-merchants during the last thirty-five years, he has seen four coal-yards successively, a small farm-house with a barn, outhouses and garden used as a bowling-green washed away, measuring at least ninety yards to the present cliff; and that vessels can now sail at high water where the land was then cultivated." The substance of this account was detailed by me at a meeting of the Norwich Geological Society.

The following notes and observations, which I have from time to time made, of the encroachments of the sea, and of the process by which the waste of the coast is effected, may serve the purpose of illustration. The high seas, aided by land springs, undermine the cliffs very rapidly where the base of them is of sand, or any loose material; and more gradually where it consists of hard clay or chalk; and when the cliffs are levelled to the beach, the beat of the waves near the shore scoops out and clears away even the hard iron pan of the so-called "elephant bed," which prevails at Bacton to the depth of four or five fathoms, so that ships can sail over it. At Bacton the present coal-yard is within a few feet of the edge of the cliff, and the ground where the artillery practised three years ago is washed away. Beyond Cromer several pinnacles of chalk, enveloped in the glacial beds figured by Sir C. Lyell in his 'Elements of Geology,' are either entirely removed, or so reduced and altered in form as to be scarcely recognizable. One of the three bluffs of chalk at Trimingham, the sole known surviving remnants of an upper bed of chalk, has entirely disappeared; another is reduced to a mere shell, and the third is much wasted. At Cromer, the old lighthouse, on the step of which was the broad-arrow, marking the highest spot in Norfolk, noted in the Ordnance Survey, namely 248 feet 10 inches, was last December precipitated to the beach, some say buried in the debris of the cliff, others crumbled to pieces by the fall, and since entirely washed away. After long search, about a month ago, I was unable to find a vestige of brick or stone remaining. At Mundesley, during the last three or four years, the walls raised round Mr. Wheatley's house have been nearly demolished; on the south side of it several cottages have been either removed or destroyed; and on the north side of it, about eight yards inland of the river-bed described by Mr. Prestwich (*Geologist*, No. 38) have been carried away, together with a Carpenter's shop and a footpath on the summit of the cliff. This river-bed was considered by that geologist to be coeval with the Hoxne brick-pits; and it was satisfactory to obtain from it a tooth and several bones of the *Elephas antiquus*, corroborative of that opinion. At Happisburgh the encroachments of the sea have been no less remarkable. The Preventive Service Station, which had been built not many years since in a more secure position than its predecessor, is now endangered. At Eccles, the tower of the old church, till lately enveloped in the Marram hills, now stands upon the beach, occasionally surrounded by waves; at least, such was the case in 1865, when breakwaters were erected, which have resisted and repelled the onslaught of the sea. In 1863, in one night about twenty yards inland of the sand-hills were washed away, and the old marks of cultivation—hedges, tracks of wheels and of horses, probably 200 years old—were laid bare. If we search historical records, we find that Eccles suffered from time to time such inroads that in 1644, only 100 acres remained out of 2,000; that several parishes, or such portions of them, have been destroyed as to leave scarcely more than their names, as little Waxham, Whimpwell, adjoining Happisburgh, Shipden, near Cromer, and Keswich, adjoining Bacton. I trouble you with these particulars because they prove that Mr. William Cubitt's statement, which has attracted considerable notice, is by no means exceptional.—JOHN GUNN, *Athenæum*, *April* 6*th*.

SNAILS.

THE snail has no power to leave its shell, as many suppose. The shell is as much a part of the animal as is the hard crust of a beetle a component part of the insect, and not only this, the snail is attached to the shell by a permanent muscular attachment, and cannot be withdrawn from it alive. In order to clean the shell of its contents, it is customary to scald it in boiling water, when the muscular attachment becomes separated from the shell and the soft parts can be easily removed. The finding of empty shells in the woods has oftentimes been cited as a proof that the snail can leave its shell, and the occurrence of certain species of snails which have no visible shell, has served to strengthen a belief in this error. When the creature dies, the soft perishable parts are soon decomposed, or else devoured by insects, leaving the more enduring shell as a monument to its memory. On the approach of winter, or the continuance of a severe drought, the snail hibernates; that is, it ceases to feed, and withdraws itself far within its shell, leaving at the same time, several barriers within the aperture of the shell composed of the mucous secretions of the animal. In this condition it remains motionless, and apparently lifeless; the mode of forming the partitions is quite curious, and will interest the observer. As the snail withdraws within the shell it inspires a certain quantity of air; the creeping disk and the parts of the animal bordering the aperture of the shell, pour out a certain quantity of mucus, which stretches completely across the aperture of the shell. This soon hardens, and the snail, by expiring most of the air in its lungs and thus reducing its bulk, retires still farther within its shell, and again forms a barrier similar to the one just formed, and oftentimes several partitions are formed in this way, one behind the other, affording a complete protection against the inroads of cold and water, and apparently of heat as well, since they always do this when confined in a dry or hot place. In a certain foreign species, this partition partakes of a calcareous nature, and thus affords a more enduring barrier. In the spring time the snail resumes its activity; the barriers are forced through by the tail, and frequently the snail devours them as if famishing after its long continued fast. All species of land snails, with a few exceptions, are oviparous; that is, the young are hatched from eggs laid by the parent. The sexes are united in each individual, though the mutual union of two individuals is necessary to fertilize the eggs; they lay from fifty to one hundred eggs at a time. The eggs of most species are very small, white in colour, and resemble homœopathic pills. If the conditions are favourable, the young issue from the eggs in the course of two or three weeks, furnished with a shell composed of one whorl and a half. The shell is increased in size by the addition of calcareous matter round the margin of the aperture, the successive lines of growth can be easily traced on the shells of most species. They attain their complete growth in from one to two years. The numbers of eggs produced by an individual varies in proportion to the greater or less protection afforded to the animal; thus in the common slug limax and allied genera having no exterior shell into which they may withdraw in times of danger, the number of eggs produced is much greater; and, according to Dr. Leach, who kept two specimens of the common garden slug in confinement, seven hundred and eighty-six eggs were laid in one year.

The vitality which the snails' eggs possess surpasses belief. Certain French naturalists assert that they have been so completely dried as to be friable between the fingers. In this dried condition they have been kept for a long time, and yet a single hour's exposure to humidity and warmth has been sufficient to restore them to their original form and elasticity. They have been dried in a furnace eight successive times, until they were reduced to an almost invisible minuteness, yet in every instance have they regained their original bulk in a moist situation. In all these instances the young have been developed in the same manner as other eggs, not subjected to this experiment (Binney). This wonderful vitality extends to the snail in all stages of its existence. We have seen certain species frozen in solid blocks of ice, and yet regain their activity when subjected to the influences of warmth. The dependence on moisture naturally places them in moist situations. Yet we have seen certain species attached to leaves where the sun had shed its scorching rays for weeks, crisping the leaves and baking the ground as dry as potter's ware, and yet the conditions not affecting in the least their vitality. They have been kept for years in pill boxes, and yet on subjecting them to moisture, have crawled about appearing as well as ever. In Woodward's "Manual of Shells" is the following, chronicled by Dr. Baird regarding the resuscitation of a desert snail :—"This individual was fixed to a tablet in the British Museum on the 25th of March, 1846, and on March 7th, 1850, it was observed that he must have come out of his shell in the interval (as the paper had been discoloured apparently in his attempts to get away) but finding escape impossible, had again retired, closing his aperture with the usual glistening film. This led to his immersion in tepid water and marvellous recovery." The power possessed by the snail to reproduce certain portions of its body removed by violence, has long attracted the attention of zoologists. The horns or tentacles, and even portions of the head, have been cut away, and in due course of time these lost parts have been restored by a new growth. The whole head has been cut away, and though in many cases terminating the life of the victim, yet in some instances the parts removed have been fully restored. This seems the more wonderful when we consider the complicated character of the head and mouth. The shell may be broken, and even portions of it removed, and yet, after a certain lapse of time, the injured parts will be repaired by a deposition of shelly matter at the fractured parts.—*The American Naturalist*, March, 1867.

SNOW.

SNOW not only constantly changes in character while falling, but after it has fallen. In our climate the snow is generally moist, and cakes together, as every one knows who ever made a snowball. At lower temperatures than are common in this country the snow is fine and dry as a powder. In Lapland it is often like sand, crisp to the tread, and suitable for skating on with those long narrow pieces of wood attached to the feet, and called *snow skates*. Should very cold weather ensue, the snow beneath the surface forms into irregular hexagonal lumps, which the Laplanders prize, and will dig out from under the recent snow to fill their kettles, as it yields more water than fresh snow. The Laps prefer the dry or sand snow for lying upon, as it does not yield so much to the weight, nor get into the folds of the dress, nor melt in the fur. It does not become sloppy before a fire, but seems to disappear by evaporation. Fresh flakes of snow contain a great deal of air, so that a depth of twenty-seven inches of snow will not give more than three inches of water. It is to this entanglement of air with minutely divided water that the snow owes its whiteness. White foam is similarly produced, as when the top of a wave is broken up, and the air rushes in between the drops. But where the sun strikes upon the snow and melts a portion of it upon the surface, the water sinks through and forms ice with the lower portions, and as this process is constantly going on; in the Swiss Alps for example, we get that peculiar kind of snow called *neve*, which is ice of a whitish colour, containing a large number of air-bubbles. As this ice becomes compressed by the over-lying mass of snow, the air-bubbles are squeezed out, and we get the ordinary ice of the glacier.

The snow that forms the caps of high mountains is permanent all the year round. In ascending the mountains we come to a point called the *snow-line*, beyond which the snow does not melt. This line varies in height, according to the climate, from many thousand feet to the level of the sea. The accumulation of the mountain snow is got rid of by the caps becoming top-heavy, as it were, and slipping off form the *avalanche*, "the thunderbolt of snow." The snow thus shot down fills up the valleys with glaciers, which, like a river, move slowly on to the lower valleys under the pressure of the accumulating snow in the upper valleys. The waste of snow and ice in melting forms the sources of many noble rivers.

The snow of the Alps at different altitudes is of various colours, or rather the colour of the light in cavities in the snow varies, a common tint being a lovely *blue*.

Snow of a *red* colour has been seen even when falling, although the red colour is usually seen on old snow. In the celebrated "Crimson Cliffs" of the Arctic regions, the red colour was found to extend to the depth of about a foot.

The colour seems to be due to minute vegetable and animal life.

Lastly, *luuminos snow* has been observed. A party on Loch Awe, in Argyleshire, overtaken by a snow shower, were astonished to find the flakes luminous, and that they continued to be so after setling on the sides of the boat and on persons' dresses. The effect was probably due to electricity.

We have already referred to the disappearance of snow by evaporation. One hundred grains of light snow have been found to lose sixty grains in weight in one night. when the temperature was below 25 deg.

The use of snow in affording a warm covering to the surface of the earth is well known. The air may be 30 deg. or 40 deg. below the freezing point of water while the ground below the snow will be only *at* the freezing point. Mr. Glaisher placed a thermometer on long grass one cloudless night in February, and found the temperature to be—6 deg., or 38 deg. below the freezing point, while a thermometer on grass covered only by three inches of snow marked 28 deg., or only 4 deg. below the freezing point. Some time after a thermometer *on* the snow gave—12 deg. ; so that there was actually a difference of 40 degrees between the surface of the snow and the grass three inches below it. Facts like these are as wonderful, and prove *design in creation* quite as much, as the astonishing conditions connected with the freezing of water. It is to this circumstance, that the ground is kept warm by snow, that we have the fine healthy colour of young wheat and grass after the snow has melted in the spring. So also in the Alps there are numerous beautiful and somewhat delicate plants, such as auriculas, saxifrages, &c., which delight the eye when the snow has disappeared, but which would have perished but for the white winter coverlid.

Snow, like ice, makes good roads in countries where the winter is long and severe, and where people ride about in *sleighs*, or carriages without wheels. As the road is noiseless the sleigh-horses are hung with merry jingling bells. Snow shoes and snow skates are worn by the pedestrians, and these presenting flat surfaces to the snow, enable them to get over the ground quickly. The Esquimaux build their houses of snow, and in the Apennines there is a harvest of snow sufficient to supply all classes in Naples with the means of cooling their summer drinks.—*People's Magazine*, *April* 20*th*.

BIRDS OF THE ISLE OF MAN.

THE following are a few remarks upon the presence and habits of some of the birds of the Isle of Man, which I trust may not be altogether uninteresting to those who find pleasure in the pursuit of natural history. They are but a few and feeble attempts to make known the history of a part of animated nature in a small and isolated fragment of Great Britain ; but I hope that the backwardness of better and abler pens to diffuse this knowledge may be sufficient to shield me from the imputation of presumption.

The golden-crested wren (*Régulus cristatus*), the most minute and one of the most beautiful of British birds, frequents our edges and plantations through all the seasons of the year. At this time it seems to be especially abundant ; but it may be that at other seasons, when the trees and edges are loaded with leaves and blossoms, this creature escapes detection through its minuteness. Its favourite haunt is the plantations of fir, where, on the fine sunny days that occur here even in mid-winter, its habits and antics may be observed with pleasure and not without instruction. Darting about in short flights, from branch to branch, and crossing the sunbeams that are broken into shafts among the trees, its wings and little crest sparkles with golden scintillations among the dark green verdure of the fir. I have always observed most of these birds to remain in pairs through the entire year. A beautiful blackbird, with several white feathers in its left wing, has frequented a corner of my garden for more than twelve months. I have on many occasions observed others marked with white in different manners. A perfectly white specimen has been shot by a gentleman near here some time ago. Pied crows also are not unfrequently seen on Douglas Head.

The ring-ouzel finds a home far up among the lonely rocky glens which wind among our mountains to the sea. Several water-ouzels, too, one of which I shot, frequented a little trout-stream some time since in this neighbourhood.

There are two remarkable cases here of a gradual extinction of species from no obvious cause whatever. Formerly the chough (*Frégilus graculus*) was so abundant that its eggs were used as an article of food, and even in later times it was by no means an uncommon bird among the hills and upon the sea coast. Now I may safely assert that it is an extinct species, well known indeed in the memories of the present generation of men, but itself very rarely if ever seen. The precipitous and rocky cliffs of the Calf of Man were once the homes of immense swarms of puffins, so numerous indeed that they waged a successful war against the rabbits, that found a shelter in the holes and crevices among the rocks. Now the rabbit is the sole tenant of this dreary coast ; he occupies without a rival his desolate habitation, and hears alone and undisturbed for ever the roar of the sublime ocean below. This extinction of the species was so apparent and so rapid, that many reasons have been invented for it by the ancient Manx, a race of men who took no thought of the operations of nature around them, save only such as excited their fears, or aroused their superstition. Among many others, the most sensible seems to be, that they were suddenly extirpated by a swarm of brown rats, which were cast ashore from the wreck of a Russian vessel.

The stormy petrel finds sometimes a congenial home here, on that turbulent element which rages among the scattered rocks in this locality. Along the coast, but especially at such parts as are most steep and precipitous, are found the shag in great plenty, the cormorant, the curlew, several species of gulls and *Tringæ*, and among them the skua. The gannet may often be seen rising high over our bays, and dropping down straight like a bolt at the fish below. Many species, not only of birds but of other animals and plants, which in the surrounding countries are very common, are here altogether wanting. Of the rarer British birds the only ones which we can lay claim to as occasional visitants, are the kingfisher, the crossbill, the great grey shrike (*Lanius excubitor*), the hoopoe, and the roller. Of the smaller birds the goldfinch and the linnet tribe are very numerous. The bullfinch is not found, the greater titmouse is very common, the woodlark and the various species of woodpecker are not found, and the nightingale was never heard to break the solitude of Mona's nights.

Partridge and moor-hen were formerly very abundant—the latter is now extinct, and the former only just remains to remind us of our present poverty. We have several common species of hawk, the raven, the hooded crow, and some others of the carrion tribe. The sharp frosts of winter generally send us various birds of passage. The wild swan is said to have been shot in the bogs of the north, and long files of wild geese are annually observed crossing the island in their flight from the frozen regions. But these mysterious voyagers only occasionally alight as a rest in their journey to more sunny climes.

Woodcock, teal, land-rail, quail, and widgeon are generally plentiful in their proper seasons. Snipe in hard weather are sometimes very abundant, a considerable number, too, remain with us during the whole year. The common and the golden plover are not at all uncommon, but are not seen in very large flocks. The swallow comes true to its season, but unaccompanied here by any of those others of its tribe, which are so common in England. The martin is unknown. The goatsucker is so rare that I can only say that it has been seen. The heron is found commonly in summer upon the rocks of the coast, and when the storms of winter drive him from thence he wanders among the streams and ponds in the interior.

The rock pigeon does not occur in great numbers, but a few are found in the caves along the coast. In those sheltered creeks and bays which occur in many parts, may be seen calmly riding on the water after a storm, several of the diver kind, the little auk very rare, and at certain seasons innumerable flocks of wild duck. As civilization advances, and man and his works multiply, in every region the wild beast of the field and the fowl of the air are ever found to diminish.

One by one they either sink under the oppression of his tyrannies ; or move away to remoter regions, where either his curiosity has not urged him, or his avarice has not been tempted. Even here, when men were few and their manners simple, animated nature existed in every variety —unawed by those terrible engines which human ingenuity has created. Eagles formerly reared their young among the rocks of Sneefell, but their memory now only exists in local traditions ; though even still, the peregrine falcon, mentioned in Sir Walter Scott's " Peveril of the Peak," haunts the cliffs on the sea-coast, though it is of rare occurrence. Lately a canary-bird has lived in this neighbourhood for nearly two years, and is now in a perfectly wild and naturalized state. It resorts with that numerous flock of small birds, which at this season of the year congregate for support around the habitations of man, and of which happily neither his indifference nor his avarice is able to deprive them.—PHILORNIS *in Land and Water, April 6th.*

THE BAMBOO.

The bamboo, from its first existence until its decay, never ceases to furnish something useful to man. Every part of it is useful, of whatever species it may be. It is said that the numerous mines of the vast empire of China are of less value to the Chinese than the precious bamboo. Rich and poor neighbours all alike benefit in some way or other from it.

The bamboo is a native of the warm climates of the east, where it grows wild. It oftentimes rises to the height of 60 or 80 feet, with a hollow stem, shining as if varnished. Little stalks, with narrow-pointed leaves, spring from the joints, and give it a graceful feathery appearance as it waves in the wind. It sometimes grows three or four inches in a single day. Persons who have closely watched it say that they have seen it rise 20 feet, and as thick as a man's wrist, in five or six weeks ; it has been known to reach 30 feet in six months.

As soon as the young shoots appear, the bamboo begins its life of usefulness. The soft juicy shoots are cooked in various ways, and used as food. Many of the poorer classes live upon it in times of scarcity. It is recorded in Chinese history that its seed has preserved the lives of thousands. As the plant grows older a sweet juice gradually collects in the hollow joints, affording a very pleasant drink. If allowed to remain in the reed this juice becomes solid, and from it is formed a kind of glass, said to be indestructible by fire. Other parts of the bamboo—as the leaves, buds, bark, and roots—are used as medicine.

Upon bamboo rafts the Siamese love to build their floating-houses; the carpenter uses the stem as posts and supports; split up it serves for floors and rafters, or as lattice-work for the sides of rooms, while the leaves form the thatching for the roof. The shipwright forms the hull of his vessel from the stem of one species, which is easily split into planks, while smaller plants supply the masts and yards; ships with masts, sails, rigging, and cables complete are fitted for sea from the wonderful bamboo.

The farmer uses the bamboo for his fences, windmills, waterpipes and wheels, ploughs, carts, wheelbarrows, spades, and all other agricultural implements; his wife's furniture, baskets, and numberless articles for domestic use, and his children's toys are all made from the same plant. It is also manufactured into umbrellas, hats, musical instruments, cups, brooms, soles or shoes, sedan chairs, and wicks of candles. The bark bruised and steeped is formed into a pulp from which paper is made; and in some parts of Asia a certain species supplies writing pens. Its fine fibres are made into twine; its shavings form stuffing for pillows, and its leaves are employed as a kind of cloak for wet weather. From the bamboo the fisherman makes his boat, with sails and oars complete; his ropes, floats, basket-cages, and other articles used in fishing. From it the hunter obtains his bows, arrows, spears, and other weapons.

In the jungles of India tigers and other wild beasts are captured in a curious manner by the help of the bamboo. When hard pressed by hunger the savage animals leave their haunts in the forests and jungles, and stealthily prowl about the villages, carrying off fowls, sheep, and sometimes even human beings. The enraged villagers meet in a suitable place, and, choosing a strong young bamboo, they bend its stoutest and tallest branches, and bury the ends many feet in the ground. A kid or a bird is fastened amongst the leaves, close by a slip noose of stout rope. The hungry beast, attracted by the cries of the decoy, rushes into the snare; the noose tightens round its throat, and in its struggles to escape loosens the buried branches, which swing aloft with mighty force, carrying up into the air the savage thief, who is there left to swing until its cries attract the watchers.

We cannot describe half the purposes to which the bamboo is applied. Indeed, it would be nearly as difficult to say what it is *not* used for as what it is. "It is in universal demand in the houses, in the fields, on water and on land, in peace and in war. Through life the Chinaman is almost dependent upon it for support, nor does it leave him until it carries him to his last resting-place on the hill-side, and even then it waves over and marks his tomb."—*The Cottager and Artisan*, April.

INCREASE IN SIZE OF ANIMALS.

At the sitting of the French Academy, on the 18th of March, M. Em. Blanchard presented a memoir "On Increase in Size amongst Cold-blooded Animals." Warm-blooded animals, that is to say, mammals and birds, ceased growing upon attaining to the adult state; and insects, whose life is very short, follow the same law. The greater part of the animals belonging to the other groups differ in this respect. Reptiles, fishes, crustaceans, and mollusks, continue to grow after fully arriving at the adult state. This growth, however, takes place with extreme slowness; yet, individuals placed in favourable conditions, and abundantly supplied with nourishment, can acquire a surprising magnitude if they attain to a very advanced age. We know that the writings of the ancients cite examples of the enormous size attained by fishes which we at the present day are accustomed to see of very moderate dimensions. And it is certain that, at a time when there was but little activity shown in fishing the rivers in France, old fishes were occasionally captured of a size greatly in excess of that of ordinary individuals. Amongst crustaceans, also, many facts prove the exceptional growth occasionally attained by some individuals. At a former date, when the creatures inhabiting the coasts of the United States were not pursued by man, the American lobster attained a large size. Two in the Museum at Paris may be termed gigantic, and led to the belief that the American lobster was much larger than the European. At the present day in the same localities the American lobster does not surpass in size its European congeners. A Japanese crab brought to Europe by M. Siebold, and recently placed in the Museum of Natural History at Paris, measures, when the claws are extended, 2·6 mètres (8 ft. 6⅓ in.), each of the anterior claws measuring 1·2 mètres (3 ft. 11⅕ in.). The same phenomenon of excessive growth has been observed in mollusks fished in unfrequented regions. The common edible mussel was found by M. Nordmann of almost incredible dimensions on the coast of the island of Edgecombe, near Sitcha, in Russian America. Oysters also have been found of gigantic size in unexplored localities. We have no definite knowledge as to the possible duration of life amongst fishes, crustaceans, and mollusks, the means to determine the point being wanting. We have, however, every reason to believe that the existence of these animals may prolong itself to an extreme old age. This is indicated by the continuance of their power of growth whilst growing old, so different from the diminution in vital vigour which age always produces in mammals and birds. Amongst the fossils of divers groups of the animal kingdom, species closely allied to species now living have been met with, but greatly exceeding the latter in size. Must we not in many cases attribute this superiority in size to the extreme old age attained by certain creatures before the appearance of man on the earth?

HEREFORD ORCHARDS.

Duncomb, in his "Agriculture of Herefordshire," quoting Evelyn's "Pomona," (A.D. 1679), said:—"The plantations of Herefordshire acquired the peculiar eminence they still retain in the reign of Charles I., when, by the noble exertions of Lord Scudamore, of Holme Lacy, and other gentlemen, Herefordshire has become in a manner one entire orchard." In this opinion I cannot agree. Indeed, Dr. Beale, in his "Herefordshire Orchards," says:—"From the greatest persons to the poorest cottage all habitations are encompassed with orchards and gardens, and in most places our hedges are enriched with rows of fruit trees, Pears or Apples, Ginnett, Moyles, or Crab trees." The same writer adds: "One reason why fruit do so abound in the county is for that no man hath of late years built him a house but with special regard to the proximity of some ground fit for an orchard, which should be some depth, as is commonly towards the foot of a descending ground, and frequently with a proclivity towards the south, and the land not too friable or hollow, but somewhat tough, binding, and tenacious, lest the winds root up the stock; and many times servants when they betake to marriage seek out an acre or two; for this they give a fine or double value for years or lives, and thereon they build a cottage and plant an orchard, which is all the wealth they have for themselves and their posterity." He also remarks upon the great size to which the fruit trees grow, and expresses an opinion that some sorts live a thousand years, in support of which he mentions, "an Apple tree at Ocle Pitchard, which one year yielded 5 hogsheads of cider without water, and never faileth of 3 hogsheads of 64 imperial gallons, which tree had not been noticed to vary in size by the owner, who was then 80 years of age." The difficulty of propagating the old fruits is treated upon at some length, and French fruit is more than once alluded to. Therefore I think Mr. Duncomb would have been more nearly correct had he said Lord Scudamore zealously applied himself to the improvement of orchard cultivation, particularly of the red-streak Apples, and probably was the introducer of French fruits; but there is abundant evidence that the art of cider-making, and the knowledge of the strength of cider, were well understood in England and in the county of Hereford several centuries before his day. Be this as it may, I believe I am right in stating that the cider made in the county is unsurpassed in strength by that produced in any other county; and not only so, but the strength is very long retained; indeed, I have myself drunk some which, after having been in bottle 56 years, left a pleasant dry roughness on the palate without acidity.—*Duckham on the Farming of Herefordshire.*

DOUBLE CRIMSON THORN.

THERE are before you plants of the new Double Crimson Thorn. Strange as it may seem this is descended from the common White Thorn, or May of our hedges. But this has not happened suddenly, but by a gradation of changes. Most observers will doubtless have noticed in our hedges that some of the plants produce flowers of a pink tinge, though still with single flowers, This is the "break" previously explained: this was step I. Some of the seedlings raised from these would give flowers of a still deeper colour. This was step 2, which we recognise in the single Rose-coloured Thorn, a variety found growing in a hedge at Guddington, in Northamptonshire. Some of the offspring of this would be of a still deeper colour, step 3, the new Scarlet Thorn. A seedling, or a sport from this or the original May of our hedge-rows would produce double flowers, and here was step 4, the Double White or new Double Pink Thorn. Now, I am not asserting that all these steps are authentically recorded, but it is well known to those who are practically engaged in these matters, that such is the rule of progress. But the origin of this new Double Crimson Thorn we do not know. It is not a seedling, but what is called a sport from the Double Pink Thorn, that is, a branch of the Double Pink produced flowers of this deep and beautiful hue. The branch was budded and grafted, and the young plants so obtained produced flowers of the same vivid colour. In the same way have been produced the many varieties of the common Hawthorn, one of the most notable, the Weeping Thorn, having been selected from a bed of seedlings by General Monkton; the upright growing variety was selected from a bed of seedlings by Mr. Ronalds, of Brentford. Now, it is the same with leaves as with flowers. Take the Pelargoniums before you. They are all originally produced from green-leaved varieties, either from sports of the branch, or later in their history from seeds of the sports so fixed. The first variegated Pelargonium originated by a branch of a green-leaved variety producing variegated leaves. This branch was cultivated till the habit became fixed. The seeds of these were saved and sown, and a brood of young plants was produced, retaining the variegation of the parent. The plants before you, which are seedlings, show this tendency; on some there are both green and variegated leaves. Now, to fix either character is the problem. If we wish to retain the green character, we nip off all the variegated leaves; if we wish to retain the variegated character we nip off all the green leaves from time to time as they appear, till the plant produces leaves of the one character only. It is the same with the Acubas. The green-leaved variety is the normal form; the variegated kinds are sports, either from branches or from seeds. This is, in brief, the process that has been worked out in all cultivated plants where leaves or flowers show a wide divergence from the normal form.—*Proceedings of the Royal Botanical Society.*

WOLVES IN IRELAND.

In a recent communication, "C. T. W." called attention to "the last British wolf" killed in Scotland, as being probably still in preservation in some country mansion, secured from injury in its glazed case; and he referred to wolves having existed in Ireland to a much later period. In the first volume of the "Journal of the Geological Society of Dublin," Dr. Scaulin brought together the ascertained facts connected with the extirpation of the wolf in the sister island, which you may deem worthy of reprinting in your journal. "Great numbers of wolves," remarks Dr. Scaulin, "formerly existed in Ireland, and they maintained their ground in this country [Ireland] for a longer period than in any other part of the empire. Campion, whose 'History of Ireland' was published in 1570, informs us that wolves were objects of the chase. 'They' (the Irish) 'are not,' he says, 'without wolves or greyhounds to hunt them; bigger of bone and limme than a colt.' A century later they appear to have been equally abundant, for we find by the journals of the House of Commons that, in 1662, Sir John Ponsonby reported from the Committee of Grievances, that a bill should be brought in to encourage the killing of wolves and foxes. Effective measures for this purpose appear to have been taken, and the wolf was at last extirpated about the year 1710. Dr. Smith, in his 'History of Kerry,' when speaking of certain ancient enclosures, observes that 'many of them were made to secure cattle from wolves, which animals were not finally extirpated till the year 1710, as I find by presentments for raising money for destroying them in some old Grand Jury books.'" Referring to Thompson's "Natural History of Ireland," I find that he cites the foregoing notice, adding that "Three places in Ireland are commemorated, each as having the last Irish wolf killed there, viz., one in the south; another near Glenarm; and the third (Wolf-hill) three miles from Belfast." Fortunate are we that our insular boundaries permitted of the extermination within their limits of so formidable and destructive a beast of prey, which is still occasionally not a little troublesome in hard winters to some of our continental neighbours. AGRICOLA. —*Land and Water.*

VULTURES IN INDIA.

A large black vulture (*Vultur calvus*), with conspicuous bare red head and neck, having a lappet of skin on either side, occasionally makes its appearance, always in pairs only, never flocking; it has a much more formidable beak than the others, which invariably give place to it, and hence it is known to Europeans as the king vulture—a name which is here bestowed upon a South American species. All of these vultures build great nests upon high trees, without affecting concealment: the social species more or less in company. They are almost voiceless birds, which merely utter a low snorting and cackling in their eagerness over their carrion, being as devoid of proper voice as are the storks and adjutants.

A small white vulturine bird (*Neophron ginginianus*), nearly akin to the "Pharoah's chicken" of Egypt, or "Ráchamáh" of Bruce, from which it has only recently been discriminated, is very common in most parts of India, but is never seen on the alluvium of Lower Bengal below the tideway of the rivers. Elsewhere it often comes into the streets, or about the open places of towns; and it is about the most disgusting of feeders, being greedy of human ordure, like the corresponding genus *Cathartes* in the New World —the so-called "turkey buzzards" and "carrion crows" of America. Hence it commonly abounds about camps, following the marches of armies. This bird is white, with black wing tips, and a yellow face; and the young are dark brown, with the bill and claws fleshy white; whereas in the African "Ráchamáh" they are black. It is often miscalled a kite by Europeans.

Towards the Himalaya, both of the great European vultures make their appearance (*Vultur monachus* and *Gyps fulvus*); and the læmmer-geyer (*Gypaëtos barbatus*) is common about some of the Himalayan stations, being the reverse of shy, from not being persecuted, as in the Swiss Alps. In the menagerie of the Zoological Society, in the Regent's Park, there is now every known species of vulture, except one South American *Cathartes*, and the three commonest vultures of India, *Gyps indicus*, *G. bengalensis*, and *Neophron ginginianus*, which are so exceedingly abundant that nobody can be induced to fancy them worth sending.—*Leisure Hour*, April 20.

New Books.

[*Our limited space must of necessity compel us to give but very short notices of new books, but they will perhaps serve as a guide as to what books our readers may ask for at their libraries.*]

Wild Life among the Pacific Islanders. By E. H. Lamont, Esq. Hurst and Blackett.

This is one of the most amusing books we have read for a very long time, and we heartily recommend it to all who would study nature under some of its wildest aspects. It is full of strange adventures, that would seem to belong more to the realms of fancy than to sober reality. Mr. Lamont has, we think, made one little mistake; we allude to the absence of dates, throughout the volume. It would have been better had they received greater attention at his hands. Notwithstanding, the volume will be found to be the best record of life among the inhabitants of the Coral Islands of the Pacific.

Mr. Lamont, with an adventurous crew, sailed from California on a trading voyage among the Pacific Islands. He was unfortunate in starting, finding his captain a drunken, dissipated gentleman, with whom he had much trouble. For several months they got on pretty well, then the vessel was wrecked, and he and his companions were forced to make the best shift possible amongst the natives. Mr. Lamont seems to have soon made himself at home, readily falling in with their customs and habits. Several times did he take unto himself a wife, apparently more from compulsion than fancy. Perhaps, it would have been as well if he had not given so much space to these ceremonies. Details of the Polynesian code of morals is none of the most welcome to Europeans, and many may think the volume would have been quite as valuable had they been left out.

The life must have had many charms, for at one time, we find, our author had thoughts of taking possession of one of the islands, and setting up a kingdom on his own account. His appearance about this time he describes as follows: "My hair was now very long, my beard thick and bushy. My trousers were in a very dilapidated condition, only kept together by the help of my fish-bone needle and bark thread, but in so coarse a fashion that I was fain to wear my nondescript coloured shirt over them as a tunic.

My costume, however, was greatly admired by these people, whatever might have been thought of it by those who were accustomed to garments of a more civilized fashion."

Of matters relating to the natural history of the islands, we have not a great deal, but what there is is very interesting. We may call attention to the native method of capturing flying fish, of which there is a picture on the outer cover, also, the description of various kinds of cocoa nut palms, and a short bit about land crabs and lobsters, which we subjoin :

> The only residents of this dreary place were hosts of tupas (land crabs) and cavios (land lobsters). They are held in the greatest abhorrence by the natives, because they eat filth, and nothing could exceed their disgust, when I made them understand that these animals were much esteemed in other countries. The land crabs, some nearly a foot long, are so tame that they dispute the footpath with you, viciously spreading out their great claws. The lobsters, although of the most brilliant colours, scarlet, orange, blue or green, marked with white, are the most disgusting things imaginable, and are generally to be seen in the evening stealthily crawling towards the beach. On the approach of an enemy they hurriedly retreat, stern foremost, pulling themselves back by their toes, and pushing at the same time with their enormous claws. If molested they will start up a tree in this manner ; their retreating motion when ascending having a most absurd appearance. When they cannot readily escape they prepare for combat and look very formidable. Though measuring about two feet in length, however, they are not really dangerous, and a blow with a stick soon finishes them.

The Birds of Norfolk, with Remarks on their Habits, Migrations, and Local Distribution. By Henry Stevenson, F.L.S., Member of the British Ornithologists' Union, vol. 1. London : John Van Voorst, 1, Paternoster Row. Norwich : Matchett and Stevenson.

An highly interesting account of the Birds of Norfolk, a county that has been long celebrated for its ornithology. This, the first volume, treats of the land birds. There is a good descriptive introduction, consisting of some 74 pages, surveying the county, from an ornithological point of view, the land birds number 142, inclusive of stragglers, and the pheasant, black grouse and red legged partridge, which have been introduced. For full particulars and details, we must refer to the volume, as our space will not permit us to review it in detail.

The Meteoric Theory of Saturn's Rings, considered with reference to the Solar Motion in Space. By S. M. D., R.A. Dublin : Hodges, Smith, and Co.

Our author, in this little pamphlet, suggests that " Saturn, with a magnitude but little inferior to that of Jupiter, and moving much more slowly in his orbit,—scarcely with two-thirds the velocity of the latter planet,—has, perhaps from this cause, accumulated the magnificent assemblage of satellites attendant on him. The velocities of the meteorites themselves, falling in from extra-planetary space, would, at Saturn's distance from the Sun, be infinitely less than at Jupiter's distance ; and this, coupled with Saturn's own slower orbital motion, would expose them, notwithstanding his inferiority in mass, for a longer period to his disturbing influence, and thus, I think, would account for the formation of his rings."

The Fishes of Zanzibar. By Lieut.-Col. R. L. Playfair and Dr. Albert C. Gunter. London : John Van Voorst.

The rivulets of Zanzibar are small, and contain but two species of fish. To compensate, there have been some 400 distinct species of salt water fishes, &c., caught off its coasts, many are found elsewhere, but the majority are peculiar to this district. This is the first description of fishes found on the part of the African coast, extending from the Straits of Babel Mandeb to the Mozambique Channel. The volume is very expensively got up and profusely illustrated ; the engravings having been executed by Mr. Ford ; several are coloured, and display to advantage the gorgeous hues that characterize the fishes of tropical seas.

The following works, likely to interest our readers, have appeared during the past few weeks :—

Old and Remarkable Trees. Printed for the Highland and Agricultural Society. W. Blackwood & Sons.

The Development of Science among Nations. By Baron Justus Liebig, F.R.S., &c. Edinburgh: Edmonston & Douglas, 1867.

FRENCH AND AMERICAN WORKS.

Elements de Botanique, etc. Par P. Duchartre, de l'Institut. 2de partie. Paris and London : Bailliere, 1867.

When the first part of this work appeared, it was considered by many to be the most complete text book on Structural and Physiological Botany. In this part the anatomy of plants is resumed, with a description of the various kinds of fruits, and the changes they undergo during the transition from the immature to the ripe condition. In succeeding chapters, M. Duchartre treats of the general phenomena of vegetation or those manifested especially in the nutrition of the plant.

Le Monde des Papillons. Texte et Dessins de Maurice Sand. Avec une Preface de G. Sand. Paris : Rothschild. London : Nutt.

This work (The World of Butterflies) consists of two parts ; the first containing a full treatise on the butterflies in Europe by the learned naturalist, M. Depuiset, and the second giving a general description of the history, classification, breeding, and preservation of butterflies. The illustrations are by the lamented Maurice Sand himself.

La Vie Souterraine, ou les Mines et les Mineurs. Par L. Simonin. Ouvrage Illustre de 160 Gravures sur bois, &c. Paris et London : Hachette.

A pleasant description of mines and miners, suitable for general readers. The first part treats of coal, the second of metals, and the third and last of precious stones. It contains one hundred and sixty woodcuts and thirty coloured maps.

Les Insectes. Par Louis Figuier. Ouvrage Illustre de 605 Figures, &c. Paris et London : Hachette.

An exhaustive treatise on insects, written in the most popular style, full of illustrations executed with great care and exactness, especially the designs illustrating the scientific part.

Volcans et Tremblements de Terre. Par Zurcher et Margolle. Ouvrage Illustré de 62 Vignettes, par E. Riou. Paris et London : Hachette.

A scientific and historical account of the volcanic action of the earth, written in a very popular style.

La Chaleur. Par Achille Cazin. Ouvrage Illustré de 92 Vignettes, par A. Jahandier. Paris et London : Hachette

An interesting work on the science of heat, treated in accordance with the recent investigations of Prof. Tyndall.

The American Naturalist, a Popular Illustrated Magazine of Natural History. No. 1. 56 pp., 8vo. Salem, Essex Institute.

The first number of a new magazine on Natural History, published monthly, edited by A. S. Packard, Dr. E. S. Marse, A. Hyatt, and F. W. Putnam. The contents are varied and highly interesting. The principal articles are the Land Snails of New England ; the Volcano of Kilauea, Hawaiian Islands, in 1864-5 ; the Fossil Reptiles of New Jersey ; the first part of a Paper on the American Silkworm and Winter Notes of an Ornithologist, together with miscellaneous notes on Botany, Zoology, and Geology, Correspondence, &c. Among its illustrations are two plates, one of the crater of Kilauea, and the other the structure of the Land Snails, from which article we have given an extract on another page.

Preliminary Report of the Geological Survey of Kansas. By G. C. Swallow, State Geologist. 198 pp., 8vo.

Contains the results of an examination of Eastern and Central Kansas made in 1865, and includes the reports of Dr. C. A. Logan on the sanitary relations of the State, and that of Dr. T. Sinks on its Climatology, and report of the Assistant-Geologist, Major F. Hawn, together with a chapter on Economical Geology.

First Annual Report of the Geology of Kansas. By B. F. Mudge, Professor of Geology, &c., in the Kansas State Agricultural College, Lawrence. 56 pp., 8vo.

Contains facts of general interest to the people of Kansas, especially in regard to saline springs and the manufacture of salt.

First Annual Report of the Geological Survey of Iowa. By C. A. White, M.D., State Geologist. 4 pp., 8vo. Des Moines.

A preliminary notice of the organization and commencement of the present survey during the past year. A brief report by the State Chemist, Professor Hinrichs, is appended.

Report of the Progress of the Geological Survey of North Carolina, 1866. By Professor W. C. Kerr, State Geologist. 56 pp., 8vo. Raleigh.

A brief report ; contains information on the Geology of the State.

On the Rock Salt Deposit of Petit Anse, Louisiana Rock-Salt Company. Report of the American Bureau of Mines. 36 pp., 4to. With Maps.

This Report is based on the investigations of Dr. C. A. Goessmann. Dr. Goessmann obtained for the composition of the salt of Petit Anse chlorid of sodium 98·8823, sulphate of lime 0·7825, chlorid of magnesium 0·0030, chlorid of calcium 0·0036, moisture 0·3286 = 100.

Description of Fossil Plants from the Chinese Coal-bearing Rocks. By J. S. Newberry, M.D., being Appendix No. 1 of Geological Researches in China, Mongolia, and Japan, by Raphael Pumpelly. 5 pp., 8vo, with a Plate. Smithsonian Contributions to Knowledge, 1867.

Geological Survey of Canada. By Sir Wm. E. Logan, Director. Report of Progress from 1863 to 1866. 322 pp., large 8vo. Ottawa.

Meetings of Learned Societies,

ROYAL GEOGRAPHICAL SOCIETY.

At the meeting of the above society on Monday evening, April 8th, Sir R. J. Murchison asked the public to suspend their belief in the death of Dr. Livingstone until further testimony could be received. He also stated that the council of the society had passed a resolution that it was desirable that an expedition should proceed to Lake Nyassa to ascertain the fate of Livingstone, and hoped for the assistance of the Government. Lieut. J. B. Bemsher read a paper on part of Mesopotamia. The author confined his remarks to the ruins, streams, and artificial navigable canals, and to the identification of the sites of ancient historic records. The town of Kathemain contains the tomb of Fatima, daughter of the Prophet, domed, covered with gilt tiles, minarets, and pretilly built with enamelled tiles. There are 15,000 inhabitants; four miles away is the tomb of Zobeyda, wife of Haroun-al-Rasheed—familiar name to all readers of the "Arabian Nights." In Xenophon's account of "The Retreat of the Ten Thousand," we learned all about Kunaxa; what then was our author's surprise to hear an Arab mention the name of "Kunassa," a mound of some thirteen miles long and eighty feet high, and a pebly ridge confirmed his opinion, as such a ridge is expressly spoken of as the halting-place of Artaxerxes. The patient examination, care, and research given to this work deserve, and won the highest praise from the various travellers in Mesopotamia, amongst whom are Mr. Felix Jones, Mr. Lynch, Sir H. Rawlinson, and others.

ZOOLOGICAL SOCIETY.

At a meeting on 11th April, Professor Huxley read a paper on the Cranial Characters of Birds. Not satisfied with the clumsy classification of Cuvier, which was by Dr. Gray stated to have been the work of the great master's pupils, and repudiated by Cuvier himself, Professor Huxley, looking for a sounder basis on which to form a surer system of classification, and seeing how constant was the law of cranial structure amongst mammalians, was directed to the study of the palate-bones of birds, rather than to the sternum or tarsal and metatarsal bones, from a more strikingly constant law pervading the families which came under his observation, and hence the system of palatine structure as a mark of classification. By a series of beautifully drawn diagrams of the palates of various genera, and wonderfully simple tables of gradation, he was able to clearly illustrate the result of his most valuable contribution to science.

Dr. J. Murie read a paper giving a description of the tracheal pouch found in the Emu.

Mr. E. P. Ramsay, of Dobroyde, Sydney, N.S.W., communicated some notes on the nidification of *Baja subcristata*. This rare bird was seen by Mr. Ramsay while on a trip to the North Richmond and Clarence rivers; the most favoured spots seemed to be the edges of the scrubs on these rivers, from whence they would sally out to the more open parts in the mornings and evenings in search of food. The sexes are alike, except that the male has the occipital crest more developed. The nest is a comparatively small structure, composed of sticks, and placed on a horizontal bough at a considerable distance from the ground, the eggs have a ground-colour of greenish-white sparingly smeared and spotted with light brown; in shape, very much rounded at the larger end, short upon the whole, the thin end pointed abruptly, average length 1 7-10 inch by 1 4-10 inch in breadth.

Dr. J. E. Gray read some notes on certain species of Cats in the collection of the British Museum.

LINNEAN SOCIETY.

At the meeting of the Linnean Society, held April 4th, G. Bentham, Esq., in the chair, Dr. Hooker exhibited a series of most interesting photographs of the Botanic Garden (*Peredenea*) of Ceylon. A very remarkable fruit was likewise exhibited of *Zanonia macrocarpa*, a new species belonging to the gourd family (*cucurbitacea*), and of the order *Nhandirobeæ*. Its size is about that of a cocoa-nut, the pericarp, which is hard and tough, encloses a number of most remarkable seeds, strangely and wonderfully constructed to wing their way, bird-like, to localities far away from the parent plant. The seed is nearly round, about the size of a shilling, brown in colour, and surrounded by a satin-like membraneous structure, shaped somewhat like a bow, but so beautifully light and buoyant that the slightest breeze bears it off with its freight as though it were thistle-down. These singularly winged seeds bear a striking resemblance to the seeds of the *Bigononæ*, although there is not the slightest kinship between the plants. The *Zanonia* is a native of Java.

Mr. J. G. Baker read an interesting and valuable paper on the geographical distribution of ferns.

ETHNOLOGICAL SOCIETY.

At the above society Dr. Hyde Clarke read a paper on iron metallurgy as practised by the ancient races, the Calybees and the Gipsies, though these people were not ethnologically identical, and described the route they took from the far East to the extremes of Europe, settling on such places as they found containing surface iron, until they exhausted it in their operations. Mr. Crawfaurd read a paper "On the Classification of the Races of Man according to the Form of the Skull," which was followed by a most interesting discussion.

ROYAL HORTICULTURAL SOCIETIES.

On April 6th, the second of Dr. Master's lectures on Plant Architecture was given, and was devoted to the consideration of the roots, which the lecturer compared in some respects to the basement story of a house. The primary root springs directly from the seed, but secondary or adventitious roots may be produced from any portion of the plant, when required for purposes of support or of nutrition. Gardeners are thus enabled to propagate by cuttings, or by portions of the leaves, and in some instances even the fruit will emit roots, as had been proved in the case of catcuses, cucumbers, &c. They may also be formed in the soil, in the air, or in water, but the root formed say from a cutting in water, seems useless when planted in earth; new roots have to be formed when the medium in which the plant is to grow, is changed. Wherever and under whatever circumstances produced, the original form of the root is that of a fine thread with a pointed conical end, the thicker portion being the body or base, which usually divides after a time into a number of branches or fibres.

BOTANICAL SOCIETY OF EDINBURGH.

At the meeting on March 14th, Isaac Anderson Henry, Esq., read a most interesting communication on the Hybridisation or Crossing of Plants. Referring to the blue dahlia he says:—"Some of my earliest efforts were among what have been since denominated 'florists' flowers,' such as the calceolaria, the dahlia, the fuchsia, &c. At that time every colour had been brought out in the dahlia save blue; and some began to speculate upon such a colour being realised, though none, so far as I was aware of, ever suggested the means of accomplishing it. This, however, seemed to me no great matter to achieve. I looked over the tribes bearing the nearest affinity to it, among its natural family, the compositæ, having the desired colour, and I found many flowering plants, such as aster, agathæa, kaulfussia, &c., having various tints of blue, sufficient, as I thought, for my purpose. With the pollen of these upon a white dahlia, a blue might, I believed, be obtained; but it was calling spirits from the vasty deep, for neither blue nor even white, not even a ripened seed, ever came of it. Unvarying failure damped my zeal bit by bit, and I began to see that I could not transfer a colour alien to any one genus from another genus remotely akin to it, to which such colour was common.

Correspondence.

Under this head we shall be glad to insert any letters of general interest.]

THE EARTH'S ORBIT AND OUR SEASONS.

Sir,—In page 31, No. 2 of the "Naturalist's Note Book," an extract from the *Scientific Review* says:—"*The elliptical form of the earth's orbit produces in reality no effect on the seasons.*" What do your scientific correspondents say to this proposition?

Writers on physical geography tell us that on account of the elliptical form of the earth's orbit, the sun is eight days longer in the northern than in the southern hemisphere; and hence a modification of temperature, and consequently, an effect on the seasons. I hope, Sir, some of your scientific correspondents will take up the subject and give it a full investigation.

I am, Sir, yours, truly,
H. H. ULIDIA.

Dromore, April 8, 1867.

THE ICE FLOE, 200 MILES LONG, IN THE NORTH ATLANTIC—CAN IT AFFECT OUR CLIMATE?

Sir,—The following paragraph appeared in the *Jersey British Press* of the 10th April, 1867:—

> Unprecedented Quantities of Ice in the North Atlantic.—It has been asserted that the severe weather recently experienced in Great Britain and France was due to atmospheric disturbances in the North Atlantic Ocean, and all arrivals at Liverpool from New York and other ports in the United States and Canada report unprecedented quantities of ice *in the mid ocean*, about 44 N. lat. and 53 W. long. One vessel had to sail for nearly 200 miles in a southerly direction alongside a *perfect continent of ice;* while others passed icebergs of enormous size, all much further south than is common at this season.

When I read this paragraph on Wednesday last which told of an ice floe in *mid ocean*, 200 miles long, I was certainly startled at so abnormal a phenomenon, for the map in that charming work, *The History of the British Seas*, by the late Professor Forbes, and Mr. Godwin Austen, F.R.S., had led me to believe that no field ice from Davis' Straits could be found east of longitude 50°, at the latitude stated, viz., 44° north. On referring to a large marine chart of Findlay's for the locality of this ice island, I find that it bars the passage completely of the outward bound vessels going to Portland, Boston and Halifax. Can your readers conceive such a mass of ice as this described as the coast of a floating continent, as it well may be? In extent, indeed, it stretches as far as Cowes is from Land's End—or as Cowes is from Liverpool—or as Yarmouth is from Sunderland—and would completely obstruct the chops of the English Channel, were it floating there! Captain Maury, of the American Navy, states, in his great work on the sea, that Lieut. de Haven, when in command of the American Arctic Expedition, was floated bodily along with the ice floe in which his vessel was wedged, 1,000 miles to the South, from the Wellington Straits; and that this same mass of pack-ice *was six times the size of all England!* or, 300,000 square miles, in surface area; (as the English exploring ship *Resolute* had found previously—when abandoned by Capt. Kellett). These ice islands melt rapidly when they reach the gulf stream, however, the temperature of those waters being about 80° Fah. As to the influence of this said ice floe on our present spring weather, I greatly doubt any such effect. 'Tis true the late Admiral Fitzroy endeavoured to account for the ungenial summer of 1860, from the great quantity of ice, from Spitzbergen, then afloat, between W. Long. 20° and N. Lat. 65°, (or about from 6 to 700 miles to the *North* West of the Hebrides); whereas this ice floe, from Davis' Straits, is over 400 miles to the south of our lowest English latitude of the Land's End, and fully 1,700 miles to the west of the westermost point of Ireland. Furthermore, I see by the same map, that the Gulf Stream does *not* extend beyond the longitude of the Azores—or 27° west—and therefore the precipitation which such a mass of ice may have caused in the vaporous atmosphere that overhangs that river of the Ocean—as Maury happily calls it—so far to the west, and so far to the south of our latitude—is *not* likely to have made *our* spring so unpropitious, and so ungenial; especially as *easterly* winds, and *not* westerly ones, have been so over prevalent for some time past. I shall be curious, however, to learn from my brother officer, and fellow Meteorologist, at Halifax, Nova Scotia, how *his* climate has been affected by this said ice-island.

COL. H. E. AUSTEN, F.M.S.

Jersey, April 12, 1867.

HEALTH OF WILD ANIMALS.

AN opinion obtains that man is eminently the subject of disease; and this opinion is advanced by the social reformer, the politician, or the theologian, whenever it seems to fall in with any particular proposition each maintains. When you point out the diseases of the domestic animals, it is urged in reply that these diseases are incident to the artificial habits which they have acquired and to the manner in which man, their master, treats them. In a recently published sermon I have seen the following: "For, remember man alone is subject to disease. The wild animal in the wood, the bird upon the tree, seldom or never know what sickness is; seldom or never are stunted or deformed. They live according to their nature, healthy and happy, and die in a good old age." There is great obscurity necessarily in investigating this subject with regard to wild animals. Health seems in many cases so essential to their very existence, that sickness and death become synonymous terms." That they die at a good old age may reasonably be disputed by every one acquainted with the habits of that vast order which lives by destroying the lives of others. That they live happy is extremely questionable, since one can scarcely walk in the country without hearing the screams of terror of the wild birds, or witnessing the start and flight of the wild quadrupeds. In "Prehistoric Times," Sir John Lubbock quotes an authority who states that wild beasts lead unhappy lives; that the antelope has a run for its life once every two days on an average, besides many false starts. Notwithstanding the fecundity of some animals, they are scarce, and it is accounted for on principles which are not calculated to make us envy their condition. Extraordinary plagues visit whole species at a time. The wild cattle at Hamilton were terribly scourged with rinderpest. During the extremely hot weather of June last, fishes were caught in the pools in the shallow shores of the Solway, half dead, as if from sunstroke, in such abundance as to be of service to the cotters living by the shore. I remember eight years ago seeing the Ayrshire coast, West Kilbride, covered with dead sea-birds, rotting in such numbers that I was glad to make a detour to avoid the stench.

The poet Moore alludes to an Eastern opinion when he alludes to—

> "The rain from the sky,
> Which turns into pearls as it falls in the sea."

But the pearl is obtained by the endeavour to avoid abnormal irritation on the part of certain sea and fresh-water shell-fish, and the precious secretion wherewith they coat the irritating particle of sand which has accidentally entered the shell may be regarded as the product of disease. I have shot and dressed rooks, and found them dreadfully invested with parasites; but yesterday I saw worms procured from the intestines of a wild or mountain cat shot in Invernesshire. Animals in their wild state have been found stunted and deformed. the Rev. J. Wood in "Common Objects of the Country," instances the case of a crippled butterfly (Atalanta), which he discovered wriggling in the grass, the wings on one side not having been developed. A friend of mine shot a rat, which had an enormous development of the canine teeth projecting like tusks from his mouth, and affording him a good mark for his shot. The wild elephant, by employing one tusk more than another in rooting plants, &c., often breaks that tusk and renders it of less commercial value. Age, with its symptoms of second childhood, creeps apace on those mammals and birds which survive in the struggle for existence. The old lion becomes lean, timid, mangy, and is thankful for prey that he would have disdained in his prime. Many beasts to their dying day bear the mark of bites or fierce battles with hoof and horn received from their own species (chiefly at the rutting season) or from those species that are their natural enemies. Bees are said to die a lingering death after the loss of their sting.

Many quadrupeds are half-drowned by floods, and half-starved by long-continued frost. Leaving out the case of the domestic animals altogether, man has no monopoly of the ills that flesh is heir to, but rather seems to be the most enviable being in creation when good luck and his own wisdom combine to assist him.

It would be interesting to compare the longevity of wild and domestic animals having close affinities, as, for instance, those of the family *Phasianidæ*. In this case I have no data as to the length of life of the wild birds; but Mr. Imrie, of Aulgirth, has at present a cross between the golden Hamburgh and common hen of the great age of twenty-nine years. It is both plump and lively. For seventeen years she was an excellent layer, but for a dozen years she has passed beyond the cares of maternity, and changes her plumage occasionally, when her tail-feathers resemble those of a cock. I kept a caged thrush twelve years. I know a cat at present of sixteen years, and a horse of thirty. To obtain the age of a wild animal is more difficult, although it has been approximated from dentition, &c., and where the weapon (harpoon, for instance) has known to have been lodged in them years before ; and I have known cases of the same red-breast resorting to the hand that fed it in winter for four or five successive seasons.

J. S.

Thornhill.

TO CORRESPONDENTS.

ERRATA—In our last month's answers to correspondents under "W. H. A.," a description of the Wellingtonia gigantea, Mr. Smith, Darley Dale Nurseries, near Matlock, writes to say the tree was planted out of a thumb pot in the year 1856 instead of 1853.

A LOVER OF FLOWERS.—Communication received too late for insertion in our present number.

M. L. A.—*Land and Water* is published weekly, price 6d., the Office is 80, Fleet Street.

KELLICK.—We have mislaid your address ; please forward, as we have a valuable Catalogue of Birds for you, forwarded by Rev. S. C. Malan. See under "Remarks, Queries, &c."

REV. R. BINGHAM.—Monogram received with thanks.

M. H.—Will answer your inquiries in next number—not sufficient space in present one.

Short Notes.

PLANT ARCHITECTURE.—In a paper read before the Royal Horticultural Society, March 30, the lecturer began by stating that the subject was chosen as one by means of which a general idea of the conformation of the higher plants could be obtained without the necessity of going into minute detail or employing many technicalities. After a passing notice of the "cells" or living bricks of which the plant is made up, the lecturer proceeded to show how, on a "foundation" of cellular tissue, of which alone the simplest plants are built, the more complex plant structures, such as the leaves, flowers, and fruit, are gradually erected, these several parts being set apart for distinct purposes, just as the rooms of an ordinary house are devoted to special uses, the several organs being connected one with another, by the medium of the root and stem or "axis," in somewhat the same way that the rooms of a house are brought into communication one with another by means of the staircase. In the simplest plants, one cell, or an aggregation of such, sufficed for all the business of life, just as in uncivilized countries a hut or a wigwam served for many purposes, for which, in other climes, and under other circumstances, separate rooms were set apart and so arranged and modified as to suit the varied requirements of the possessor. In the case of plants, it was shown that the possession of separate organs, and the form of these latter, were specially dependent either on adaptation to particular purposes and to external circumstances, such as mutual accommodation, the necessity for light, air, increased supply of nutriment, etc., or to the hereditary transmission of the form and attributes of the parent plants to the offspring. Plant architecture, or the plan upon which plants are built up, is thus in great measure the result of a compromise between these two agencies. In the case of the flowering plant, all the numerous and seemingly different organs may readily be referred to two primary ones, the axis and the leaf, the differences in form, etc., being brought about by the action of the causes before mentioned. Except for convenience sake, the axis and leaf could hardly be considered as intrinsically different, but for practical purposes it was necessary to consider these two as distinct elements in plant construction. The principal forms and modifications of these, it was intimated, would be treated of in the following lectures.

THE CARRION CROW.—A correspondent of the *Field* writes :—"The craftiness of the crow is very interesting to the observer, and I have good opportunities of watching the habits of these birds. Not far from my house, and near to a lake, there is a plantation containing some fine old Scotch firs, which tower above the surrounding trees, and have boles many feet in height before there is a bough. In those firs I have for many years observed a pair of crows. If one pair is trapped or shot, and their nestlings destroyed in the season, another pair very soon arrive to take their place. These birds I have always observed live pretty sumptuously throughout the year. At the present season, just as the rooks begin to lay, the crows visit their nests and pillage their eggs. March 11 was with us the first day they commenced rummaging over the rookery. On coming near the rookery that morning I saw that the poor rooks were in great trepidation, cawing, fluttering, and flying round and round, and there were the pair of crows as unconcerned as possible, hopping from one nest to the other, rummaging and peeping into all. Soon one of them flew off with an egg to a high piece of ground in the park. I have observed similar proceedings for years, and the most astonishing thing to me is that a pair of crows should be allowed to strut over and rob a rookery in such a bold, independent manner, amongst hundreds of rooks, not one of which has the courage to give battle or offer to defend its own. There is not a vast difference in the size and weight of the rook and crow, and as to numbers the rook is a thousand or more to one. As soon as the pheasants begin to lay the crows commence seeking out their nests, and they are not at all particular as to the state the eggs are in, whether fresh laid or about to hatch. On a high piece of ground of some extent, away from all trees and fences, out of gun shot, where they have a famous position of observing from a distance any approaching enemy, I have seen scores of empty shells, and it is easy to observe by their colour and the streaks of blood that they have been pillaged in every stage of incubation.

THE FORESTS OF RUSSIA.—Amongst the sources of wealth, unproductive as yet, are the forests of Russia, and which, for the most part, have the appearance of virgin forests. The forests of Prussia, which are not to be compared with those of Russia, are, thanks to a model management, the source of considerable revenue to the State, whilst those of the latter are at present only an expense. Forest economy in Russia is in its infancy : its importance is reserved for the future ; and the numerous railways now in the course of construction will contribute largely to its extension. The western part of Northern Europe is poor in forests, whilst, on the contrary, the east is rich. Finland, the governments of Olonetz, Wologda, Kastroma, and Archangel all possess immense forests. On the 80,269,375 deciatines (1 deciatina = 2 acres, 2 roods, 32 perches) that form the government of Archangel, 30,312,209 deciatinas are covered with forests, of which 1,151,088 are the property of the Admiralty, as they furnish excellent timber for ship-building purposes. One district alone (Misen) contains 14,865,872 deciatinas of forest land; and the districts of Pinega, Kemi, Cholmogory, Onega, and Archangel are equally rich in timber. The Scotch Fir (Pinus sylvestris) is found in great abundance, and the forests of the governments are principally composed of this tree; however there is no scarcity of the Spruce Fir, the Siberian Cedar, the Birch, and the Poplar. The first exportation of timber from Archangel appears to have been in 1761. During the last ten years the value of the timber exported from the ports of Archangel and Onega amounted to 346,978 roubles (£54,215), a small sum as compared with the riches of the forests of the country; and the Grand Duchy of Finland, though much smaller in extent, exports annually timber to the value of upwards of two millions of roubles (£312,500). Better results may be predicted for the future, now that the Petchora, and especially its mouths, are navigable.—*Correspondance Russe.*

DOVES BREEDING IN A CHURCH.—You will be interested to hear of an unusual situation for a stock dove's nest. The spire of the old village church here is a wooden one, and has for many a day given shelter to a loving couple of white owls and several pairs of starlings, not to mention the noisy sparrows which have taken possession of the water-spouts. During the summer of 1865 I often remarked a pair of pigeons flying out from a good-sized hole at the base of the spire. They looked like stock doves, but the scarcity of this species here in the breeding season, as well as the unlikely situation which they had selected, caused me to think at the time that they could be only a pair of escaped blue rocks. I could easily have shot one of the birds as he flew out, and thus settled the question, but I was anxious to prove something more. An inspection of the interior of the church, which I unfortunately delayed until the summer was far advanced, showed that a nest, evidently that of a pigeon, had been built upon a cross beam above the bells. I was too late then for the eggs; the young had flown. There was nothing for it, therefore, but to wait until the following spring, and then endeavour to secure a pair of young birds. Accordingly, jotting down a memorandum in my note-book, and resolving to keep the fact of there being pigeons in the church spire to myself, I waited patiently for another nesting season. My patience has been so far rewarded that, after watching a pair of birds take up their quarter in the same site as that selected the previous year, and after several anxious visits of inspection, I was at length enabled, in July, 1866, to carry off a pair of fine young pigeons, which were almost ready to fly. The "coo" of the stock dove is very peculiar, and by this time I had heard and seen enough of the birds in question to convince me that they belonged to this species. Their young, which I had secured, after being fed for some time in a cage in the house, were transferred to my aviary. They are now in fine plumage, and have proved, as I suspected, to be undoubtedly the young of *Columba œnas.*—*J. Edmund Harting* (*Kingsbury*, *Middlesex*), *in Field*, March 30.

THE ATMOSPHERE, IN ITS RELATION TO HEAT.——The movable and transparent element by which we are surrounded, not only furnishes the gases necessary to the respiration of living creatures, but it moreover acts in a manner essential to the general distribution of the light and heat dispensed by the sun. The winds diffuse over the surface of the earth the heat they bring from the burning soil of tropical regions. And the operation of the atmosphere is not limited to that effect. It serves as a vast fire-screen interposed between the earth and the sun; it retains or absorbs a part of the rays which the latter transmits to us; and while it moderates the original warmth and splendour of that luminary, it reverts those calorific rays which escape from the sun, and which without this kindly barrier would be lost in the celestial spaces. The solar rays, taken together, undergo such an absorption in the atmosphere, that about a half is lost by the way; and this loss is shared by both the visible and the obscure rays. The radiation from the ground, on the other hand, is composed exclusively of obscure heat; it experiences from the atmosphere a much greater resistance than luminous heat does; a tenth only of the terrestrial radiation traverses the thick protecting mantle formed by the air around the globe. This result may be compared with that of our glazed structures. The sunshine passes freely through the glass and warms the soil which it covers; but the heat which the latter throws off in the way of radiation cannot now pass outside, because glass is opaque to obscure heat, and that heat is accumulated within the glass. The atmosphere, therefore, produces the same effect as if the whole earth was inclosed in glass; it transforms it into a hothouse; the sun effects an entrance, but its exit is barred. Such is the function of the air in respect to the calorific rays of the sun.—*P. Radau*, *Revue des Deux Mondes*, tome lxvi. p. 223.

THE AVOSET.—In *Land and Water*, April 6th, the following accounts of three of these birds having been shot appears:—1. A very unusual bird was shot on Tuesday, the 19th ult., by Captain Pretor, near the Portland Ferry Bridge. It is called the "avoset," and we are informed it is many years since a specimen has occurred in this locality. In Yarrell's "British Birds" it is thus described:—"It is a singular looking bird, both in reference to its beak, as well as its feet. The beak is curved upwards, is slender, pointed, and flexible, having much the appearance of a thin piece of elastic whalebone. The semi-palmated feet seem only intended to support the bird on soft mud, as it never attempts to paddle or swim when out of its depth. The bird is a great rarity now, the last being heard of in 1837. Four are recorded as having been obtained in Devonshire, and one or two in Dorsetshire." 2. "It will probably interest some of your readers to be informed that a beautiful specimen of that rare British bird the scooping avoset (*Recurvirostra avocetta*) was recently killed in the estuary of the River Exe. It has been sent for preservation to Mr. Tucker, of Queen-street, Exeter, and is to be presented to the Albert Museum of this city. I am not aware that the avoset has ever previously been obtained in our western county." 3. "When at Christ Church a few days since, Mr. Hart, the well-known taxidermist of that town, showed me a very fine specimen of the avoset, shot near the entrance of the harbour. Thus we have this week a record of three specimens of this most interesting and curious bird, which, as Mr. Wood informs us, is sometimes called the "cobbler's awl bird," the beak being very much the shape of this instrument. These poor birds formerly bred in this country; 'the eggs are yellowish brown, with black marks.'—*Frank Buckland.*

BEET ROOT SUGAR.—An experiment has recently been made of growing beet-root for the manufacture of sugar in Illinois. About 400 acres of fresh prairie were planted, and 4,000 tons of beet raised, which is in course of being worked up, and is expected to reach nearly 400,000lb. of refined sugar. The United States have been like ourselves, the most important consumers of cane-grown sugar, the continent generally having long accepted the beet as the raw material of their supply. But if the Americans and the Germans and French can grow their own sugar, why should not we do so? Beet-root is not like sugar-cane, an article only to be reared in tropical or semi-tropical countries. We raise it in England of excellent quality, and not only do we raise the crop, but of the sugar we consume, about one-sixth part—according to the *Produce Markets Review*—is beet-root sugar imported from the continent. There seems no reason why this additional branch of industry should not be added to the many enterprises of the country. While the beet has been planted for purposes of sugar-making on the prairies of the West, the cane is being vigorously cultivated in the colony of Queensland. It is estimated that upwards of a thousand miles of alluvial soil on the coast line of that colony is in every way adapted to the cultivation of the cane. The attention of all countries seems to be directed more and more to the supply of sugar. We used to be dependent for our supply upon the West Indies, just as we were upon America for our cotton; but every day the sugar question is becoming better understood, and in spite of our scale of duties, the West Indians will be compelled to feel more and more the influence of competition, and the necessity for exerting themselves accordingly.—*Mechanics' Magazine.*

POULTRY AND THEIR EGGS.—Mr. J. D. Mechi, writing to the *Gardener's Chronicle* upon this subject, says:—"An old shoemaker in this neighbourhood, too blind to work at his trade, has devoted his workshop to chicken-rearing, keeping a fire in the grate all winter. The consequence was an abundant supply of eggs at 1½d. each wholesale, and young chickens that in a month's time will bring 7s. per pair wholesale. He has thus realised exceptional and profitable results, and escaped that competition of cheapness and abundance which is produced by mild or summer weather." Another gentleman, a Mr. Burr, writing to *Land and Water* upon the same, says:—"Whilst on a visit at a country house near Ballinasloe early in February, a few years ago, I used to view with great admiration a splendid supply of eggs, which the mistress of the mansion was proud of producing daily at breakfast. On my venturing to inquire what valuable breed of fowls she possessed, to produce such gratifying results, she informed me that the poultry were of no particular sort, but the hens were induced to lay perpetually by having their roosting house warmed with a flue during the winter months. I had often heard of this, but had never witnessed its practical results before. Soon after my return home from this visit, application was made to me to have our fowlhouse repaired; and finding it in a very dilapidated state, I at once resolved to build a new one, which I have had warmed with a flue, and it has answered most admirably. During cold weather a fire is lighted about two or three o'clock p.m., which is not required to be kept up, and this keeps the place comfortable until the following morning. The fowls are of no particular breed, but I hear the black hens are considered the best layers.

THE LYRE-BIRD (*Menura Superba*).—A fine healthy specimen of this bird has been received at the Zoological Gardens, Regent's Park. We believe it is the first that has been imported alive into Europe. Mr. Gould, in his "Birds of Australia," says:—"The lyre-bird is of a wandering disposition, and although it keeps to the same brush, it is constantly traversing it from one end to the other, from mountain-top to the bottom of the gullies, whose steep and rugged sides present no obstacle to its long legs and powerful muscular thighs; it is also capable of performing extraordinary leaps, and I have heard it stated that it will spring to the ledge of a rock or the branch of a tree ten feet perpendicularly from the ground. It appears to be of solitary habits, as I have never seen more than a pair together, and these only in a single instance; they were both males, and were chasing each other round and round with extreme rapidity, apparently in play, pausing every now and then to utter their long, shrill calls; while thus employed they carried the tail horizontally, as they always do when running quickly through the bushes, that being the only position in which it could be conveniently borne. Among its many curious habits is that of forming small hillocks, which are constantly visited during the day, and upon which the male is continually trampling, at the same time erecting and spreading out his tail in the most graceful manner, and uttering his various cries, sometimes pouring forth his natural notes, at others mocking those of other birds, and even the howling of the dingo. The early morning and the evening are the periods when it is most animated and active."

OWLS.—"I do not know many sights more engaging to a naturalist than one which often presents itself on peering into a thickly-growing Scotch fir-tree. A family party of some half-dozen long-eared owls may be descried perched in close proximity to the observer's head. Their bodies are drawn up perpendicularly and attenuated in a most marvellous manner, the ear-tufts nearly erect, or, if not exactly parallel to one another, slightly inclined inwards. Except these, there is nothing to break the stiff rectangle of the bird's outline. There they sit, one and all, swaying slowly upon one foot, and gravely winking one eye at the intruder. Underneath such an owl-roost as this is certain to be found a large quantity of the pellets ejected by its frequenters, and a good notion of their usual food is to be gathered from an examination of the same. Half-grown rats and mice, chiefly the former, constitute the staple, but small birds contribute no small share, and I have recognised among the remains unquestionable bones of the wheatear, willow wren, chaffinch, greenfinch, bullfinch, and yellow bunting. How the owls catch them I am unable to say, but I am bound to mention that never in a single instance have I discovered a trace of any game bird; and I feel assured that the keepers, who wage war against the long-eared owl for the protection of their young pheasants and partridges, are not only giving themselves unnecessary trouble, but are also guilty of the folly of exterminating their best friends, for the number of rats destroyed by this species is enormous, and I look upon the rat as the game-preserver's worst enemy."—*Stevenson's Birds of Norfolk.*

CATFISH.—Sir: I enclose an extract from a private letter, containing some very interesting particulars of the capture of two catfish.—T. D. P. "It was in August, when we were returning from Norway. The yacht's course was from Christiansand to the North Coast of England. We had splendid weather, and hardly breeze enough to sail sufficiently fast for fishing; however, we had the trawl overboard, and, to the surprise of the sailors, all at once the net got fast on something (for we were in the middle of the North Sea, miles and miles from land, and no ship in sight). Almost as soon as the net was got free the trawl was hauled on board with a very fair catch of fish, and among them were two horrid catfish, which snapped at everything near them. I begged to have them thrown overboard. So, putting the handle of a mop near one, it seized the stick with such strength and fury that it was lifted up and put into the sea again, leaving, however, one of its teeth broken off in the mop-stick by the violence of its bite. The other fish was killed and its head brought home and given to a museum. The teeth are most curious, some are canine, and some calculated for vegetable diet. The sailors said that no doubt the net had caught on part of a wreck, and that the catfish haunted the remains of a vessel, for they generally are in pairs, and are very fond of playing at 'bo-peep' among pieces of timber, &c. They must have been only just caught when the net was hoisted up, as none of the other fish were bitten. They certainly would have attacked them had they been any time together. The sailors told me that the jaws of a catfish are so powerful that they can bite off a man's arm. This may be the fact or not; but they look vicious enough for any atrocity."—*Land and Water*, March 30.

FOXES.—Eight species, or perhaps it will be safer to say different varieties, of foxes contribute their jackets to supply the fur market—the black or silver, the cross, the red, the white, the blue, the kitt, the grey, and the Corsac fox. The family *Canidæ* includes animals characterised by having the jaws somewhat produced, the legs of equal length, the anterior furnished with five, and the posterior with four toes. The claws are not retractile; and from walking, as it were, on tiptoe, the term "digitigrada" (Lat. *digitus*, a toe, *gradus*, a step) is applied to all members of the group. The foremost feet have each a rudimentary toe or thumb, placed some little distance up the leg, to which a claw is generally, though not invariably, attached. Foxes belong to the sub-family *Vulpinæ*. Professor Baird ("N. Am. Mam.") says: "It is in this group of the *Canidæ* that we find animals known in North America and the Old World as foxes, several species of which belong to this continent. Among these there are many very distinct types, with one or more species in each." In the one type the tail is uniformly bushy all round, composed of long hairs, mixed in amongst a shorter fur. The skull, very wolf-like in character, has the temporal crests strongly developed, and extending somewhat beyond the parieto-frontal suture; the muzzle is much produced and particularly sharp. To the group of foxes thus characterised the Professor says the name of *Vulpes* ought to be applied.

FLIES IN AMBER.—Of the dipterous flies in *amber* 850 species have been counted, and all these are proboscidians. The amber period reveals to us much information, as we can by the mummies so entombed in this substance, arrive at certain knowledge that the animal life of the time was identical in some respects with our own. Swarms of one kind preying on others, and insects depending on mammals for support, and even at that time the frequent victims of spiders. The flora, too, was rich in species, and then as now, certain kinds were common to America and to Europe. Diptera are more generally distributed, and even as civilization extends, these creatures find their way into localities where they had formerly no habitation. Cheese and dried meat is one vehicle for their transport, and a kind now common in Egypt, the Gallopagos islands, and Greenland, have accompanied man in his intercourse with these far distant lands. The horse and the sheep have also carried with them flies, to lands where these animals are acclimatised; one unwieldy fly is carried over the seas by the heron, another by the swallow, wherever she builds her nest. Cultivated plants bring their share of living flies; the orange, and lemon, and the olive, have each their little winged companion. Such testimony, humble as it seems, is an invaluable agent in palæontological investigation.

SULPHUR MOUNTAINS.—The sulphur mountains on the east of the lake My'-vatn, in Iceland, were recently described by Mr. C. W. Shepherd; they are very wonderful, being of various colours, a variety of mixtures of red and yellow; from their sides are emited numerous jets of steam, and masses of bright yellow sulphur are strewed all around them; at the foot, on the eastern side, one of the mud geysers—huge cauldrons of blue mud, in different stages of solution—some bubble and spurt like filthy water, others are so gross that they can scarcely heave the massive bubbles to the surface. All around the soil was very treacherous, consisting of hot mud with a covering of sulphur about an inch in thickness; the clouds of steam, the roaring, the spluttering, and the splashing of the loathsome pits, the sickening smell and the desolate country had an awe-inspiring effect on the beholders. Not far off was the Obsidian mountain, where the sides are covered with shining polished surfaces of the mineral, resembling broken wine-bottles in appearance, and presenting the greatest difficulties to the explorer, as their edges were equally sharp and dangerous to walk upon.

HAILSTONES IN CHINA.—On Tuesday at six p.m. on June 5, 1866, a thunder storm came from the north-east, and broke over Peking with great violence. The hailstones soon followed the first dash of rain, and increased in size and quantity till the rain almost seemed to cease. The shower lasted 40 minutes, leaving the yards white with hailstones, but as the wind was light no damage was done. The very largest stones were 4 to 4½ inches in circumference; the prevailing shape was conical, and almost all the stones exhibited a kernal of clear ice enclosed in frozen snow, with a covering of ice outside. The strata of air through which they passed in their descent must have been of very different degrees of temperature to produce such distinct layers of ice and snow in the stones. Such hailstorms are not frequent in the North of China, and the people say that this one is the most remarkable since July, 1838, when the stones were like oranges and apples and melons for size, and did great damage to dwellings and trees.—S. W. Williams in the *American Journal of Science and Art*, March.

SEA MARKS ON THE COAST OF SWEDEN.—The Earl of Selkirk has communicated to the Geological Society certain conclusions at which he has arrived after an examination of ancient sea-marks on the coast of Sweden. Sir Charles Lyell, who saw those marks thirty-two years ago, has endeavoured to show that they indicate a gradual rise in the land of about three feet in a century. The Earl, on the contrary, argues that no certain proof of such a rise is afforded by the marks, for the fluctuations in the level of the water are so great from day to day and week to week, that to institute a comparison of difference of level is difficult if not impossible. The strongest indication of a change of level was shown by the marks off Gefle; but even in them there were elements of uncertainty. The question thus opened is important and interesting. Sweden has a staff of able geologists; will they set themselves to work and settle the question?—*Athenæum*, April 13th.

THE CAT.—Lieut.-Colonel W. A. G. Wright, Royal Marines, has been recently transferred on promotion from Plymouth to the division at Portsmouth. On Saturday, the 30th of December, a favourite cat was secured in a basket, and forwarded by the South Devon Railway to Portsmouth, when it was received in the colonel's new residence. The cat remained the Saturday night, but was missed on the Sunday. On Wednesday, the 3rd of January, it was observed in the garden in the rear of its master's former residence at Stonehouse (Plymouth), now unoccupied, and has since been fed by an officer of the corps, who lives adjoining. The animal is a large, strong male; it was born in Stonehouse, is only twelve months old, and never before quitted the town. How it managed to find its way back so great a distance in so short a time seem inexplicable.—*Our Own Fireside*, April.

RARE BIRDS.—A correspondent of *Land and Water*, writing from Henley-on-Thames, says:—"The 'little auk,' or rotche, was shot in a pond near here the last week in December, 1866. Bramblings, or mountain finches, have been abundant; I have had several fine specimens. A fine specimen of the oyster-catcher was shot at Mill-end last Wednesday. I have sent it to Gardiner to preserve for me. It was in very clean, neat plumage. I fancy this must be far inland for it to wander. A few sea-gulls and two curlews have been obtained this winter. Fieldfares and redwings very abundant; moorcocks more so than usual. I saw a very large otter that was shot up the Loddon last Friday, the 8th; it weighed 23½lb. Young Parrot shot it. It was feeding on a large chubb, and had a fine set of teeth. Otters are now becoming very rare around here.

FISH IN THE AMAZON.—In the lecture on the Amazon, of which we gave a portion in our last number, Professor Agassiz says that he has not found one fish in common with those in any other fresh-water basin; that different parts of the Amazon have fishes peculiar to themselves; and as an instance of the teeming variety of the Amazon, he adds, that a pool of only a few hundred square yards showed 200 kinds of fish, which is as many as the entire Mississippi can boast. In the Amazon itself 2,000 different kinds exist, a great proportion of which are most excellent eating. Several are extremely curious, one especially, which has the power of walking or creeping on dry land, and of worming its way up the trunks of trees.

THE RAVEN.—The following account of a raven appears in a recent number of *The Field*:—Many years ago the landlord of the Black Inn at Mansfield had a tame raven in his stable-yard. I always frequented this inn when I had occasion to go to Mansfield, and whenever I drove or rode into the yard, Tom, the Raven, was sure to be about; and if the ostler was not in sight, he invariably called out with a hoarse but distinct voice, "Ostler, come and take the gentleman's horse!" bustling about all the time in a pompous, amusing manner, as if he had sole charge of the yard.

REPRODUCTIVE POWER OF FISHES.—The great reproductive power of fishes certainly seems, *a priori*, to negative the probability of any permanent diminution of their numbers being affected by any appliances devised by the ingenuity of man. Terrestrial animals give birth as a rule to but one or two young at a time; some fish produce thousands, others millions of ova, a large proportion of which are probably matured into life. A female cod has been found to contain 3,400,000 eggs; a flounder, 1,250,000; a sole, 1,000,000; a mackerel, 500,000; and a herring, 36,000.—The *Quarterly Review*

Remarks, Queries, &c.

(*Under this head we shall be happy to insert original Remarks, Queries, &c.*)

Summer Migrants.—The following notes, showing the time of arrival and places where seen or heard, have been collected from the *Field* and other papers:—

The Sand Martin—Chudleigh, Devon (one shot), March 12th. St. Austells, March 20th. Shaine's Castle, co. Antrim, March 25th. East Retford, Notts, March 26th. Twickenham; Wellington, Salop; Birmingham; Petworth, Sussex, March 27th. Wistastor, Nantwich, March 28th. Dorchester (40 or 50 flying in N.W. direction), March 29th. Saltburn-on-the-Sea, March 30th. Maidstone, April 16th.

The House Martin—Wellington, Salop (two) March 29th.

The Swallow—Isle of Anglesea, March 23rd. Emlyn, Carmarthenshire, March 24th. Wellington, Salop, March 27th. Dorchester, April 1st. Dunster, Somerset (about twenty), April 1st. Boxted, Essex, April 2nd. Islip, Oxon, April 8th. Dorking, April 8th. Petworth, April 10th. Southampton, April 12th. Meldreth, April 10th. Berwickshire, April 14th. Maidstone, April 16th.

The Wheatear—Crumbles, Eastbourne, March 19th and 20th. St. Austells (plentiful), March 20th. Dorchester; Kington, Herefordshire, March 22nd. Ratham, Chichester, March 24th.

Chiff-chaff—Ratham, Chichester, March 21st. Dorchester, one on the 26th, plentiful on 28th. St. Austells, March 27th. Seaham Harbour, Sunderland, April 1st. Saltburn-on-the-Sea, April 7th.

The Wryneck—In Suffolk on March 28th. Meldreth, April 10th. Southampton, April 15th. Maidstone, April 16th.

The Willow Wren—Petworth, March 26th. Seaham Harbour, Sunderland, March 27th.

The Hoopoe—St. Austells (one shot), March 27th.

The Corncrake—Hornsey, March 26th (one heard).

The Skylark—Kington, Herefordshire, March 17th.

The Cuckoo—Southampton, April 15th.

The Nightingale—Winchester, April 9th. Ipswich, April 13th. Maidstone, April 14th. Windsor Forest, April 17th. Cheltenham, April 18th.

The Water Wagtail—On March 15th a pied wagtail was seen in the most complete summer plumage, and on the 18th one with back perfectly black.

Notes from Maidstone.—*January* commenced in this district with a heavy fall of snow, beginning and terminating on the 2nd. About the middle of the month snow fell again, followed by a severe frost, lasting nearly ten days. I noticed in the Earl of Romney's park a red-skinned mouse run from the bank by the road, and career round and over the foot of a gentleman passing at the time. The mouse paid no attention to our watching, and at last leisurely ran off. The snow being thick at the time, the little animal was probably tamed by hunger.

Snow was much deeper in East than West Kent, and the London, Chatham, & Dover and South-Eastern Rails were for a short time blocked, and beyond Margate for about a mile the snow was piled 17 feet. Sunday (20th) was unusually cold, with a dead N.E. wind. (22nd) Rain and sleet fell at night, freezing upon the pavement, covering the streets with ice; and a gentleman at Chatham was enabled to use his skates. The 23rd brought a "thaw," and the snow quickly went. (29th) Found the primrose (primata vulgaris) on Yalding Hill.

February (3rd) Fine and mild; gnats about. (White—Feb. 3rd). Furze, fl. (ulex europæus). (White—Feb. 1st). On 17th observed an owl fly over the Ashford-road at Roseacre. (20th) A beautiful day, sunny and warm; lambs in the fields; gnats and bees. Saw a couple of Bats at Harrietsham. (24th) Wood anemone (anemone nemorosa), fl. The violet (viola adorata) has been out some time. Helleborus fœtidus fl. on the Boxley Hill. (27th) Cold weather again. Snow fell a few mornings since.

March (7th) An anular eclipse of the sun observed about 10.15; (8th) snow, the third time this winter we have had "white weather" (9th) rain; (10th) dull, cloudy, and wet; (30th) an extraordinary mixture—fine, cloudy, windy, rain, snow, hail, lightning and thunder. March has not been so characteristic in the way of wind this year as is usual, I think. (31st) fine. The woods are painted with flowers. Bittercress (cardamine pratensis); Lesser Periwinkle (vinca minor), primrose, anemone, violet, &c.

Maidstone. T. F., Jun..

Aids to Egg-collecting.—Your correspondent "Kellick" is, I fear, wide from the mark in his egg-collecting. As I have some experience in this branch of natural history, he will perhaps allow me to give him a few hints:—

(1) Strictly speaking, no egg is worth anything that is not taken in the nest. Few, if any, dealers are to be trusted: turkeys' eggs for golden eagles'—the commonest terns' and gulls' eggs for some of the rarest, &c., are among the early chances of a young inexperienced oologist. As it is impossible to find very many eggs oneself, except by devoting one's existence to the pursuit, the next best thing is to be very wary in the purchase, and intelligent in the identification of eggs purchased or exchanged; for a collection of eggs is valuable only in proportion of its authenticity.

(2) There is only one way of blowing an egg, and that is through a hole made on one side of the egg at its largest circumference. This hole should be made not with a drill—that is sure in most cases to crack the egg—but with a small round (rat-tail) file, the end of which has been sharpened into a three-faced point; the great advantage of this is that the file bores a hole into the shell without cracking it. But care must be taken not to push the file in too abruptly, but only by degrees, twirling it all the while between the thumb and the index. By this means I have drilled a hole in scores of the smallest eggs—as, for instance, those of the golden-crested wren—without breaking one.

(3) When the hole is made, then take a blow-pipe, draw with your mouth water into it, and blow that water back into the egg through the hole made. The water will thus bring out the yolk, and at the same time wash the inside of the egg clean.

(4) Then let the egg rest on the hole, on a towel, or handkerchief; all the wet will run out into the cloth, and the egg will soon be dry.

(5) Eggs should never be "mounted." If they be collected for a scientific purpose, nothing short of the number laid by the bird (if that be attainable) should be procured. A small round piece of paper is then gummed over the hole, and a number referring to the catalogue is then written over it. I send you a copy of it for Mr. "Kellick's" acceptance. No labels should be glued on the egg, nor any name written in ink. The way I mention is by far the best, and the most satisfactory.

(6) It sometimes happens that the egg is brooded, so that the water will fail to bring out its contents. In that case, if the egg be a common one, the best way is to throw it away; if, however, it be worth keeping, then make no hole with the drill-file, but with a sharp penknife cut off slowly a square bit of the shell—put it by, take out the contents of the egg, and then gum the bit of shell back into its place. Various liquids are recommended for the purpose of dissolving the brooded yolk, but they all injure the shell. S. C. MALAN.

Broadwindsor Vicarage, April 8th.

Having read in your last number of the "Naturalist's Note Book" that "Kellick" would be greatly obliged by any hints regarding the blowing of eggs, I send him an account of the following method, which I have used for a long time with great success:—

Take a clear straw—or a fine stem of grass is best —and, making a hole in the centre of the egg rather larger than the straw, blow gently through the straw, when the yolk and white will both come out of the hole, and leave the egg empty.

This method is preferable to any other, because it only makes one hole in the shell instead of two, and consequently weakens the egg much less. Also, when the egg is placed on card the hole is covered, and the egg presents to all appearance a perfect shell; it also prevents insects getting into the egg. M. L. A.

Redhill.

The method of mounting eggs on cardboard, &c., is seldom resorted to, cabinets being employed where good collections are made. Would some of your correspondents inform me what size a cabinet must be, and in what manner constructed so that a moderate collection of all the British birds' eggs may be arranged according to a scientific classification, and not mixed up according to size, as is generally the case? I should like also to know the probable cost. "AQUILA."

St. John's Wood, N.W.

POPULATION OF THE SEA.—If the sea is prodigal of life to a degree that baffles our powers of conception, it is no less a scene of boundless destruction. The life of all fishes is one of perfect warfare, and the only law that pervades the great world of waters is that of the strongest, the swiftest, and most voracious. The carnage of the sea immeasurably exceeds even that which is permitted to perplex our reason on the earth. We know, however, that without it the population of the ocean would soon become so immense that, vast as it is, it would not suffice for its multitudinous inhabitants. Few fishes probably die a natural death, and some seem to have been created solely to devour others; there is probably none which does not feed on some other species or on its own. Many of the monsters that swim the watery plains are provided with maws capable of engulphing thousands of their kind in a day. A hogshead of herrings has been taken out of the belly of a whale. A shark probably destroys tens of thousands in a year. Fifteen full-sized herrings have been found in the stomach of a cod. If we allow a codfish only two herrings per day for his subsistence, and suppose him to feed on herrings for only seven months in the year, we have 420 herrings as his allowance during that period, and 50 codfish equal one fisherman in destructive power; but the quantity of cod, and of ling, which are as destructive as cod, taken in 1861, and registered by the Scotch Fishery Board, was, says the commissioners, over 81,000 cwts. On an average 30 codfish make 1 cwt. of dried fish, and 2,400,000 will equal 48,000 fishermen. In other words, the cod and ling caught on the Scotch coast in 1861, if they had been left in the water, would have devoured as many herrings as were caught by all the fishermen of Scotland and six thousand more in the same year; but as the cod and ling caught were certainly not one-tenth of those left behind, we may fairly estimate the destruction of herrings by those voracious fish alone as at least ten times as great as that effected by all the fishermen in Scotland—*Quarterly Review*, April, 1867.

GOLD FISH.—Perhaps one of your numerous readers can favour me with an explanation of the following case:—

For some years I have kept a small aquarium, confining my attention chiefly to gold and silver fish. Up to the present time they have been very healthy; but a short time ago the largest gold fish (about four inches in length) was attacked with a kind of fungus, or film, which made its appearance on its tail and dorsal fin, when all the firmness of those parts seemed to give way. The tail came off, and the dorsal fin stuck quite firmly down to its back. The film continued spreading towards the head, till about a fortnight after the fish had been attacked the fungus had so enclosed the whole of its body that it could hardly move; and soon afterwards died.

Mr. Frank Buckland, in his "Curiosities of Natural History," mentions the disease as one from which fish do not recover. I find two or three other writers on aquariums, &c., mention it; but no person has given any clear account of it.

If one of your correspondents or readers could give me some account of this disease, or its prevention, he will greatly oblige,

London. AQUARIAN.

FLEAS IN DOGS.—Can any of your readers give a harmless, and, at the same time, effectual remedy for destroying fleas in dogs—something that will not injure them if they lick themselves after the application? J. L.

[Persian insect powder, to be had of Messrs. Butler and M'Culloch, Covent Garden Market, in 1s. and 2s. 6d. packets, is the best we know of.—ED.]

Vitality of Wasps.—I will feel obliged if some of your correspondents will state the cause of the extraordinary vitality of wasps after having been decapitated. I lately caught a large one in the greenhouse; I severed his head, and also the bag or hinder part from the body, making three separate parts; the head lived for about sixty seconds, opening and shutting the jaws, and moving the feelers; the remaining two parts showed strong signs of vitality for thirty minutes after being severed, the legs and wings in the one moving actively and almost constantly; and the hinder part was also very active, darting out the sting when merely touched. I cannot help thinking this activity, after such complete severation, as very strange.—J. L.

Esquimaux in Europe.—Your article on "Esquimaux in Europe," page 13 in the January number, extracted from the *Saturday Review*, has attracted my attention in an especial manner. Surely the period when the Esquimaux and the reindeer were indigenous to South Gaul, when the Thames, the Rhine, and the Elbe flowed into *one common* embouchure, or basin, or bay, and when the Straits of Dover scarcely existed, must have been some ages *preadamic*. In this case, what becomes of the miserable theory that "man" existed on the earth only A.M. 5,871 years ago?—viz. A.C. 4,004, P.C. 1,867 = 5,871. E. Ward.

Wren's Nest.—The nests "Fox" mentioned in last "Naturalist's Note Book" were those of the common wren in both cases.

They love especially the root of a broom-bush, on the ground—the turf in a hole of the wall, or beneath the trunk of a tree—for their nest, which has quite a rough exterior, but a nice feathery inside, and always the same small aperture in the side for entrance and exit. J. R.

Granite in Devon and Cornwall.—Can any of your numerous correspondents give me any information respecting the large beds of disintegrated granite found in Devon and Cornwall, and from which the China clay is obtained?

Plympton. A. Wentzl.

Blood Stains.—Could some of your readers be so kind as to inform me how to detect spots of blood upon any article?

The reason I wish to know is because I have an Indian arrow which has some red spots on it, and I have an opinion that it is spots of blood. Mattie.

STATE OF THE WEATHER NEAR LONDON.

March and April.	Moon's Age.	Barometer.		Temperature.					Wind	Rain.	Remarks.
				Of the Air.			of the Earth				
		Max.	Min.	Max	Min	Mean	1 foot deep	2 feet deep			
Thurs. 14	8	29.622	29.512	41	28	34.5	40	40	E.	.00	Snow and sleet; overcast; snow in broad flakes; overcast.
Friday 15	9	29.778	29.692	40	25	32.5	40	40	N.E.	.11	Snowing; uniformly overcast; fine at night.
Satur. 16	10	29.985	29.875	38	20	29.0	40	40	N.E.	.00	Clear and frosty; fine, with white clouds; frosty at night.
Sunday 17	11	29.995	29.678	38	30	34.0	39	39	E.	.00	Frosty, with slight haze; cloudy and fine; boisterous.
Mon. 18	12	29.496	29.445	35	30	32.5	40	39	E.	.06	Very cold and boisterous; snowing; densely overcast.
Tues. 19	13	29.370	29.272	36	32	34.0	39	39	N.E.	.25	Overcast; heavy fall of snow and sleet; drizzling rain at night.
Wed. 20	○	29.744	29.409	43	27	35.0	39	39	N.E.	.00	Densely clouded; cloudy and cold; overcast at night.
Thurs. 21	15	29.816	29.644	44	30	37.0	39	39	N.E.	.28	Partially overcast; cold, with dry air; fine at night.
Friday 22	16	29.730	29.631	49	36	42.5	39	39	E.	.02	Heavy fall of snow; hazy; foggy at night.
Satur. 23	17	29.722	29.460	57	43	50.0	40	40	S.	.04	Uniformly overcast; rain; overcast at night.
Sunday 24	18	29.596	29.495	59	43	51.0	41	41	S.W.	.00	Fine; very fine; overcast.
Mon. 25	19	29.697	29.446	53	47	50.0	43	43	S.	.12	Cloudy; rain; fine at night.
Tues. 26	20	29.397	29.335	57	40	48.5	45	43	S.W.	.00	Very boisterous; fine, with low white clouds; fine.
Wed. 27	21	29.421	29.299	57	29	43.0	45	44	S.W.	.00	Cloudy; fine, dry air, overcast; fine at night.
Thurs. 28	☾	29.456	29.370	55	30	42.5	46	44	S.W.	.00	Very clear, quite cloudless; fine at night.
Friday 29	23	29.652	29.543	52	31	41.5	46	44	W.	.00	Fine; cloudy and cold; fine; very slight frost.
Satur. 30	24	29.745	29.738	50	31	40.5	46	44	N.W.	.01	Fine; showery; storm of thunder; lightning, with hail at night.
Sunday 31	25	30.331	30.020	58	23	40.5	46	44	N.W.	.00	Cold and exceedingly clear; fine; very fine at night; frosty.
Mon. 1	26	30.393	30.297	59	46	52.5	46	44	W.	.00	Fine; sunshine, with dry air; densely overcast.
Tues. 2	27	30.136	30.081	62	35	48.5	48	44	W.	.00	Overcast; cloudy; fine at night.
Wed. 3	28	30.215	30.097	64	45	54.5	48	45		.00	Fine; very fine throughout; occasionally rather boisterous at night.
Thurs. 4	●	29,857	29.792	59	40	48.5	49	46	N.W.	.02	Cloudy; boisterous and showery; fine at night.
Friday 5	1	30.033	29.945	62	40	51.0	50	46	W.	.01	Slight haze; very fine, with dry air: very fine at night.
Satur. 6	2	29.992	29.979	62	45	53.5	50	46	W.	.00	Overcast; cloudy; fine at night.
Sunday 7	3	29,972	29.644	58	40	49.0	50	47	S.W.	.02	Cloudy; overcast; densely overcast at night.
Mon. 8	4	29.527	29.331	53	39	46.0	50	47	S.W.	.14	Cloudy; boisterous, with rain; very boisterous at night.
Tues. 9	5	29.755	29.545	59	29	44.0	50	47	N.W.	.02	Cold and boisterous; fine; thunder, vivid lightning and some hail.
Wed. 10	6	29.899	29.511	54	40	47.0	49	47	S.W.	.02	Fine; overcast; boisterous, with rain at night.
Thurs. 11	☽	29.967	29.516	57	26	41.5	49	46	N.W.	.00	Boisterous and stormy; very boisterous, with dense dusky clouds; fine at night.
Friday 12	8	30.158	30.066	58	38	48.0	49	46	S.W.	.03	Clear and very fine throughout.
Satur. 13	9	30.057	29.799	55	46	50.5	49	47	S.W.	.09	Rain and rather boisterous; densely overcast at night.
Sunday 14	10	29.607	29.295	49	41	45.0	50	46	S.W.	.30	Boisterous, with rain; very wet and boisterous.
Mon. 15	11	29.695	29.415	62	40	51.0	50	47	W.	.04	Boisterous; showery and boisterous; fine.
Tues. 16	12	29.722	29.608	56	41	48.5	50	47	S.W.	.06	Rain; showery, drizzly; overcast at night.
Wed. 17	13	29.901	29.742	62	37	49.5	50	47	N.W.	.01	Hazy and drizzly; exceedingly fine throughout.

BEAVERS AND THEIR CAMPS.

THE vicinity of a large beaver camp very much resembles that around an Indian camp, so much so that a person unacquainted with and unprepared for the animal might readily mistake the former for the latter. I will try and describe one that I found on the head of the Metapedine.

The stream was some fifteen or twenty feet in width, with a considerable fall. Four dams had been constructed at intervals of about a hundred yards. The pond formed by the upper dam but one was probably about an acre in extent, of a depth of eight feet in the centre, shoaling off towards the edges. The place was thickly wooded; but, as it was an old colony, the trees in the pond had all been killed by the water—some remained standing, others had fallen and lay on the surface. The dam was semicircular, convex to the stream, and about a hundred and fifty yards in length; in an irregular way it surrounded the upper half of the pond. The spot for building this dam had been chosen, as is invariably the case, with remarkable judgment; and all natural features, such as little islands, rocks, stumps of trees, &c., had been turned to good account. The centre of the dam was about five feet in height, and eight or ten in width at the base, and so compact that it took two men with axes the greater part of an hour to cut through it an aperture six feet wide. The camp was situated near the centre of the pond on the original bank of the stream. It was about the size and shape of an ordinary haystack, a little flattened down; rather more than two-thirds showed above the water (about eight feet). Internally it contained one large circular apartment, about six feet six inches in diameter; the roof, which was arched or dome-shaped, being two feet three or four inches in the centre, and gradually sloping downwards to the edge. The floor was ten inches above water-mark, and contained four beds made of chips of wood cut very fine. The walls were from four to five feet thick, and made altogether of earth and wood. There were three entrances, all under water. Close to the camp was the storehouse—an accumulation of fresh logs and branches submerged in the water for winter use; I calculated that there must have been half a dozen ordinary cartloads, and the pile was not completed. The peeled boughs had been piled on the house and dam. Some of them had been hauled a distance of sixty yards by land, and twice that distance by water. There were six well-made roads, twelve or fourteen inches in width, and worn quite smooth and hard, running into the woods in different directions. Trees of all sizes, from a foot in diameter downwards, that had been felled by the beaver, lay scattered all round the pond and in the water—some freshly cut, others decayed and covered with moss. The boughs of the larger ones had been lopped off and carried to the storehouse, the bark of the stems being eaten on the spot. Smaller trees had been felled, cut into logs, and carried bodily off. Saplings of the size of an axe-handle had been cut as with one slanting blow of an axe; but the larger trees were gnawed all round. Dry sticks and roots that obstructed their roads had been cut neatly off at the proper breadth, and the piece thrown aside.

* * * * *

The beaver selects a little island, or shallow spot near the centre of his pond, for building on. A dry bed close to deep water is essential; this is one of the ends secured by dam building, which keeps the water much on the same level throughout the year. In its earlier stages the house resembles a gigantic bird's nest, made of mud, sticks, and stones; branches are then laid across to serve as rafters, more sticks and mud being piled on the top of them to complete the edifice. The beavers then burrow into the pile, cut off projecting sticks, and fashion out the apartment or apartments—for there are frequently more than one. The walls and roof are made of great thickness—four or five feet, to resist the frost; and for the same purpose the roof gets a fresh plastering of mud every fall, just before the frost commences. When a house is inhabited by a large family of beavers the heat they generate is so great as to melt the snow on the roof, which is but partially frozen.

I never could perceive that beavers use their tails as trowels, though they have got the credit of it. I have little doubt, however, but that this appendage is made to serve some useful purpose in the plastering line, else why should it, unlike other amphibious animals, have the tail flat horizontally. If of no other use, it certainly makes a comfortable seat for them.

Beavers do not inhabit the same house for more than three or four successive years. The reason of this is obvious. It is easier to build a new house, where wood is plenty, than to haul their provisions a long distance to the old one. Hence, on streams and lakes inhabited by beavers there are always a great number of camps in all stages of repair and dilapidation, also dams without end; but these latter are always kept in repair within half a mile or so of the dwelling-house. The series of ponds thus formed gives them a greater extent of feeding ground, and enables them to haul wood up stream. Sometimes beavers, driven away by a feeling of insecurity or some other cause, will leave a new house and take up their abode in an old shanty, returning to their deserted abode every night for provisions.

The materials used for building the dams are the same as for the houses. I have never seen the beaver actually at work at the building. I do not think they build in the daytime. The sticks they use vary in size, from the thickness of a man's finger to that of his leg, and in length from one foot up to five or six. Most of them are peeled previous to being worked up. Dead wood also and stones are used. I have seen the latter as big as a man's head, that must have been carried some little distance. Stones and mud they carry with their fore paws or hands, pressing them against their chest and walking on their hind legs. Some sticks lie horizontally, others in a slanting position, with the branchy end pointing up in the air and the butts down stream, and some short ones are in a perpendicular position. The chief difficulty must be with the foundation ; when once that is laid it is comparatively easy to lean boughs against it as I have described, place others crossways, weigh them down with stones and plaster them with mud. Often they take advantage of a windfall, or a little chain of rocks, for they are capital engineers. The slope on the upper side of the dam is much less than on the lower, and the top is accurately levelled.

I will briefly enumerate their reasons for dam building. 1st. To deepen the water around their camp, enabling them to dive and defy pursuit. 2ndly. As a protection from the frosts of winter, which would freeze shallow water to the bottom. 3rdly. To equalise the height of the water throughout the year, and prevent their beds from being flooded. 4thly. To enable them to haul wood with greater ease. In addition to these I really believe that beavers like dam building for the amusement it affords them. I am aware that in this opinion I differ from other writers. But, if they are right, how is it that on lakes having streams running into or from them, such streams are invariably dammed by the beavers of the lake? At the head of a lake two or three miles in circumference I have seen a beaver house ; at the outlet of the same lake, a mile off, a dam built and kept in perfect repair by the beavers. Now I cannot see what use this could have been ; it would scarcely raise the level of the water as many inches as the lake was fathoms in depth.

On the Miramichi, New Brunswick, I found a small brook—a rapid stream with a great fall. One family of eight or ten beavers lived on it, and in the course of little more than half a mile they had constructed no less than thirteen dams, each about three feet high. The effect of this in winter time was curious enough ; the ponds, frozen over and covered with snow, formed a series of tolerably regular steps or terraces.

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Although the principal food of the beaver consists in the bark of certain trees, it is lucky for them that they are not wholly dependent upon wood, else they would die of starvation when large fires sweep over the land. They dive for and eat with great relish the large cucumber-shaped roots of the water-lily and other stalks and roots that grow in the water. The barks they eat in order of preference are those of the popple, or American poplar (a soft, sappy tree of very rapid growth), white birch, alder, rowan tree, moose wood, white maple, willow, spruce, and cedar ; the two latter only when no other can be procured. In summer they wander about, stopping here and there to feed. I have heard of their visiting a deserted camp and eating potatoes that they found therein ; and it is not an unusual occurrence to find an old mocassin or the lid of a kettle worked up in a beaver house or dam. In winter they pay a daily or nightly visit under the ice to their stores, which are close at hand, and carry off a stick to camp, where they eat the bark at leisure. They are very cleanly in their habits, never making a mess in the camp, which, together with their beds of chips and savings, they keep scrupulously clean. Periodically they have a cleaning-out day, when the *débris* of peeled sticks, &c., are thrown out of camp. In thaws and on very mild days they come out from under the ice for a "constitutional" and a little bit of fresh bark. Their tracks in the snow resemble those of an enormous goose, the marks made by the little fore feet or hands being entirely obliterated by the webbed hind ones.

In no way do the beavers show their superior intelligence over the rest of the brute creation more than by their knowledge of the power of combined efforts. Thus two or more beavers will work at the same tree, chopping away at different sides till the scraps meet and the tree falls. They cut trees about a foot and a half from the ground, sitting on their haunches and tails, their arms against or round the trunk. The chips they take out vary from half an inch to two inches in length, chopped at both ends. I have seen several trees of five or six inches in diameter cut by a small family of beavers in the course of one night. The hunter tells the age of the beaver by the tooth marks, and from this can give a very shrewd guess of the number in the camp. I measured the stump of a birch tree freshly cut by beavers on the Memoyckel, New Brunswick ; it was between thirteen and fourteen inches in diameter. The boughs had been neatly lopped off as with an axe, and nothing remained but the trunk, which supplied me and my party with back logs for the night.—*Field.*

ESPARTO.

WHO has not heard of the lamentations of the paper-makers, whose wailings on the paucity of rags, and the total absence of fibre suited to their requirements, were followed by mortuary dirges on the decline and fall of their beautiful manufacture; whilst, as a contemporaneous fact, there continued to bloom and die on the arid plains bordering the sunny Mediterranean, a perennial plant, containing within its wiry stem no less than 70 per cent. of fibre, eminently suited to their wants? This plant is the *Gramen spartum*, Plinii, *Stipa tenacissima*, Linn. By the Spaniards it is called Esparto, and by the French Alfa. It is placed by botanists among the sedges, and is indigenous to the southern shores of Portugal, Spain, and Italy, as well as to the coast of Northern Africa, from Algeria to the confines of Egypt. It grows in tufts like a rush, is perennial in habit, attains a height of from 18 to 30 inches, according to situation, and, having a basis of silica and iron, flourishes on arid soil. Its principal *habitats*, however, are Spain and Algeria, from which countries a supply sufficient for all present demands may be drawn with ease. There is probably no plant within our knowledge which possesses so remarkable a history as that now under review. Pliny, that most careful and observant of naturalists, gives a surprisingly accurate description of the *Spartum*, and enumerates the uses to which it was put in his day. He speaks of it as a morbid production—"confined to a single country only; for in reality it is a curse to the soil, as there is nothing whatever that can be grown or sown in its vicinity." He describes the species of spartum found in Africa as of stunted growth, of no use whatever for practical purposes; and, altogether, he seems to entertain a very poor opinion of the African variety. It is interesting to note the similarity of uses found for the plant in the days of Pliny, to those prevailing in our own. Then, as now, the peasantry stuffed their beds with it, and, no doubt, obtained as springy a couch as is yielded by our own native heather. It was used as fuel made into torches, woven and plaited into summer garments for the shepherds, and manufactured into shoes which, under the name of Alpargates, are still extensively used by the poorer inhabitants of the Iberian peninsula. It was also very largely used for cordage; and we have the authority of Mr. M'Culloch for the statement that cables made from Esparto were some years ago—if they are not still—preferred in the Spanish navy to similar stores made from hemp. Merely to enumerate the articles of utility into the construction of which Esparto entered, would in fact be a recapitulation of the utensils and appliances appertaining to the domestic economy and manufacturing industry of the Spaniards and Carthagenians. Pliny most appropriately designates his *Gramen spartum* a marvellous plant; and the reflection is by no means a flattering one that, notwithstanding his painstaking researches, and the uninterrupted use of the plant in the same districts through centuries of time, we should have failed to bring our chemical knowledge to bear on its constitutional difficulties, until our need became so *exigeant* as to render further neglect well-nigh impossible.

During the past ten years the French have been indefatigable in the prosecution of researches in the utilization of Alfa as a paper-making fibre, and it is to the *savans* of that country that we are primarily indebted for a knowledge of the economic conditions of the plant; possibly because it grows abundantly on a portion of their own territory, the natural resources of which the French Government are most anxious to develop. The province of Oran, in Algeria, is that in which the traffic Alfa is mostly concentrated. There it alternates with the Dwarf Palm and Asphodel, and it grows luxuriantly from the coast up to the minor peaks of the contiguous mountain ranges. The crop should be gathered in the months of April, May, and June, varying according to the forwardness of the season; the object being to secure the plant while yet green, yet as near as possible to ripeness. If gathered too green, the fibre is deficient both in quantity and strength, whilst if allowed to ripen fully, the constituent elements of silica and iron are established too securely in its structure. The best time for collecting, according to Pliny, is between the Ides of May and those of June, a statement which has been fully confirmed by modern practice. On the best method of gathering, the ancient philosopher is equally in accord with our own observations. The plant, he says, is twisted round levers of bone or holm oak, to get it up with the greater facility. It has been proved experimentally, that this is the best mode of reaping the crop, having a due regard to the succeeding harvest, as cutting not only injures the plant, but altogether endangers its vitality, thus rendering the labour of collection exceedingly severe, as the workmen must both pull and stoop as he traverses the ground. The *modus operandi* is very simple. Providing himself with a stick of moderate thickness, the labourer grasps a handful of Alfa, twists it round the stick, and, by a sharp pull with both hands, disengages the stalks at the articulations. Securing the bunch under his left arm, he pulls away until, no longer able to hold the produce, he throws it down to be tied into a bundle called a *Manada*, and proceeds with his work *de novo*. These bundles are then ranged in the field to dry, a result which is usually attained in a week, during which time the Alfa looses about 40 per cent of its weight. The bundles, or *Manadas*, are then packed into bales and carried to the port of shipment. It is not improbable that, in course of time, the propagation of Alfa with a view to increased supply may be requisite in places suited to its growth, as it is only in particular areas that its preparation for export can be conducted, on account of the cost of carriage to practicable shipping points on the seaboard. At present the demand from England and France is exclusively on behalf of the paper manufacture ; but should application of the fibre be extended—and there is no reason why it should not be so with great advantage, its culture will become an important branch of Algerian husbandry. Arrived in this country and stored at a paper-mill, the *Manadas* should be ranged so as to allow of the roots and tops being pulled, an operation which clears the Alfa from a good deal of waste substance adhering more or less to the stalks. It has now the appearance of dried rushes, firm and wiry to the touch, and as unlikely-looking a material from which to manufacture white paper as can well be imagined. Nothing, however, can be simpler. After having been opened and well shaken out, the stalks are thrown into a boiler containing a strong solution of caustic alkali, and are boiled until a handful can be twisted asunder with ease. It has now parted with a good deal of colouring matter, and is ready, after having drained sufficiently to be broken and washed—operations which are carried on simultaneously in what is technically known as a "washing engine," an elliptical trough having the machinery on one side of a partition, placed down the centre of the engine, but terminating at some distance from either end ; the effect of this arrangement being that the material in the engine is made to flow round the partition or "midfeather," by the rotary action of the machinery. The Alfa now gradually assumes a light yellowish tinge, and with the introduction to the engine of a quantity of chloride of lime the process of bleaching commences. Meanwhile the Alfa is being drawn out into fine short filaments by the triturating action of the machinery. Gradually all colour departs, and, as it flows round the engine, the stuff more nearly resembles a duct of snow-white cream than anything else to which it can be likened. Now the shutters of the washing cover are withdrawn, in order to thoroughly eliminate the "bleach." That done, and the stuff finished as regards sizing and tint, a valve in the bottom of the engine is drawn, the prepared Alfa plunges into the stuff chest at the head of the paper-machine, and, in less time than is consumed in recording the fact, is ready for the hands of the printer.—*Nature and Art Magazine*, May, 1867.

RAIN.

One of the most curious things about rain is the inequality of its distribution. The reader is of course aware that rain may be measured in inches in almost any vessel set out to catch it. If a pail, for example, be put out in an open space on the ground, it will catch as much rain as would otherwise have sunk into the ground on the space occupied by the bottom of the pail. If we visit the pail after every shower, we may, by means of a two-foot rule, tell what depth of rain has fallen. This is the principle of the rain-gauge. In practice better means are of course adopted, so as to prevent evaporation and to measure the depth. Now it is of great consequence where we place our rain-gauge. It might be supposed of no importance whether it were on the top of the house or in the garden close by. And yet, strange to say, a gauge in a garden near Westminster Abbey caught twenty-three inches of rain in the course of the year, while one on the roof of a house caught only eighteen inches, and one on the top of the Abbey only twelve inches. The fact is, rain forms at a very low elevation, much lower than is generally supposed; or, if not actually formed at a very low elevation, it increases the size of the drops which come from higher levels. Thus, while Mr. Glaisher was descending in a balloon, he passed through a dry, and then through a wet fog, when the drops of rain were exceedingly fine, covering his note-book like pins' points. These increased in size on approaching the earth, but more rapidly when very near the earth.

The average quantity of rain which falls at Greenwich every year is rather more than twenty-five inches ; but it varies in a remarkable manner even in different parts of London. Thus, in 1863, 17·42 inches of rain fell in Spring Gardens, 20·10 inches at Guildhall, 21·07 inches in Bryanstone Square, 19·09 inches in Chiswell Street, and 21·49 inches in Camden Town. The variation is still more remarkable if we extend our observations to different parts of England. Cold, high lands, for example, act as condensers to moist air, and precipitate rain which would otherwise have passed without falling. This must not be confused with a less amount of rain at the top of a tall building than on the ground, for the tall mountains stop the moist air and squeeze out its contents. Hence in some parts of North Wales the annual rainfall amounts to one hundred inches; and in Cumberland, at one remarkably wet spot, the Stye, at the head of Borrowdale, to nearly two hundred inches. In the flat districts of Bedfordshire, Lincolnshire, and the east coast, on the contrary, the rainfall scarcely exceeds twenty inches per annum.

The reader is aware that what is called a *low barometer* is generally a sign of rain, as a *high barometer* is of fine weather. That is the general rule, although there may be rain when the mercury stands high, and it may be fine when the mercury is low. The barometer represents the weight of a column of air from the spot where it is placed to the top of the atmosphere, which may be about fifty miles in vertical height. If water were used in the barometer instead of mercury, the barometer tube would have to be upwards of thirty-five feet in length, since mercury is about thirteen and a half times heavier than water. A column of mercury thirty inches high, in a tube of one square inch section, weighs about fifteen pounds. A similar column of water, thirty-four feet high, weighs the same; and as these columns of mercury and of water are supported by the air, a similar column of air about fifty miles high must also weigh about fifteen pounds. This is what constitutes atmospheric pressure. We also see that it is a varying quantity; for as the barometer observed at the same spot is sometimes high and sometimes low, sometimes at nearly thirty-one inches, and at other times a little above twenty-eight inches, this shows an increase of atmospheric pressure at one time and a diminution at another.

Now the atmosphere is made up of a number of ingredients, the two principal of which, the oxygen and the nitrogen, are in fixed quantities, *i. e.*, about one-fifth of oxygen and four-fifths of nitrogen. The other ingredients are found in varying quantities. Omitting all notice of accidental impurities, such as smoke and sulphur acids, which depend on locality, there are two ingredients which are found in the air in varying quantities at every part of the earth's surface, and at every elevation. These are carbonic acid, one of the products of the respiration of animals, and the burning of coals, gas, candles, &c.; and aqueous vapour, or vapour of water, the result of the evaporation of the waters of the earth, whether salt or fresh, whether from the surface of water or of moist earth.

Now all these ingredients are concerned in supporting the mercury column in the barometer. The oxygen atmosphere raises it a certain number of inches; the nitrogen atmosphere a still larger number; the carbonic acid atmosphere a small varying fraction of an inch; the aqueous vapour atmosphere a larger but still varying fraction of an inch; and the sum of all these quantities is what we call the height of the barometer.

Now let us attend only to the aqueous vapour atmosphere, dismissing the other three atmospheres. Suppose, for example, the air were entirely composed of aqueous vapour; its quantity, elasticity, and pressure would, as it now does, depend entirely on its temperature. At sixty degrees Fahrenheit the mercury would stand in the barometer at the height of rather more than half an inch; at seventy degrees, at about three-quarters of an inch; at eighty degrees, at one inch; at one hundred degrees, at nearly two inches. At the temperature of boiling water, however, the vapour would have sufficient force to support thirty inches of mercury, which is the same as the mean atmospheric pressure of the whole atmosphere. Of course we never get such a natural temperature, so that, in endeavouring to explain the formation of rain, we must keep to temperatures actually observed.

Bearing in mind what was said about the quantity of vapour depending on temperature, let us inquire what would take place, supposing a cold air charged with vapour at forty degrees were to blow into an air charged with vapour at sixty degrees. In the absence of experiment, almost any thoughtful person would say that it would be like mingling equal quantities of water at forty and sixty degrees, the result of which, we know, is the mean temperature of fifty degrees. So he would say, in the present case, the moist air at forty degrees mingling with the moist air at sixty degrees would produce a mean, both as respects temperature and moisture, and matters would remain unchanged; except that the cold moist air would have become a little warmer, and have taken up more moisture, while the warmer moist air would have become a little cooler, and have given up a little of its moisture to the air that was at forty degrees. Any one would say that the air at fifty degrees would, as respects its moisture, represent the mean of the two quantities of air at forty and at sixty degrees, and there would be no rainfall, or *precipitation*, as it is called. Nevertheless, this reasoning would be all wrong; for by another of those admirable adjustments, which mark design as clearly as the sun at noonday, it has been ordained that the elasticity of aqueous vapour shall diminish much more rapidly than its temperature; so that the air at fifty degrees holds less than the mean quantity of vapour contained in air at forty degrees and air at sixty degrees.

For example:—Vapour at forty degrees will support nearly a quarter of an inch of mercury, at sixty degrees about half an inch of mercury;

or, more accurately, the quantities are 0·24 and 0·52; add these two together, and divide by 2, and we get 0·38 as the mean quantity of vapour in the two temperatures. But it is proved by experiment that vapour at fifty degrees will support only 0·36, so that there is a difference of 0·02 inch of mercury, which represents the quantity of vapour which cannot be taken up by the mean temperature, and it is this which falls as rain.—*People's Magazine*, May.

MOSS-ANIMALS, OR FRESH WATER POLYZOA.

Among all the creatures found in our pools and lakes, none are more pleasing to the eye when carefully examined than the moss-animals. These delicate animal flowers may be found in communities expanding their shadowy plumes in the darker recesses of our ponds, attached to the under side of submerged sticks, logs and stones.

The moss-animals of our fresh waters are, with two exceptions, all members of one group, called phylactolæmata, or animals with guarded throats; that is, having a little flap outside of the mouth which guards this aperture. The two exceptions mentioned have not this characteristic, and, therefore, belong to the same division as their marine relatives, the gymnolæmata, or polyzoa with unguarded throats. Notwithstanding their harsh scientific name, the phylactolæmata are light, elegant, mossy growths, and, when placed under a low power of the microscope, are even more beautiful than the flowers they resemble.

Their plant-like aspect, however, is a mere semblance, notwithstanding the branching mode of growth. If we examine any one specimen of the genus Fredericella, we speedily learn that the trunk is not a single, straight, solid stem, as in the plants, but made up of a series of minute, dark brown, tubular cells, arranged in a line, with the main branches and shorter twigs, also constructed of cells, arranged in a similar manner. Each cell is a single animal, and contains the organs and muscles of one being, though so intimately attached to others, and so merged in the general life of the community, that it cannot, strictly speaking, be called an individual. An individual is but one animal, freely following the bent of its own will, and containing within itself an isolated, independent system of organs.

The lower portion of every cell is straight, being the continuation of the axis of the trunk, or branch of which it is a part; but the upper portion turns out of the direct line with an elbow-like bend, elevating one end above the stem. This end is free, and is surmounted by a transparent tube, which is closed by a round disc, perforated by the mouth, and bearing a crown of translucent, slender threads, called tentacles, which gracefully curve upwards like the petals of a lily. The tongue-like flap overhangs the mouth, and is continually jerked downward, instantly resuming its upright position, as if it were hinged on springs. This is a most curious organ, and although situated outside of the mouth, it seems to answer many of the ordinary purposes of a tongue. It evidently discriminates between the different kinds of food, but is oftener employed to close the mouth over some struggling animalcule which obstinately refuses to be swallowed. It is a fleshy semicircular prominence formed by a fold of the disc, and is both the door of a trap and an organ of taste combined.

The crown is interesting, not only on account of its beauty and delicate transparency, but from the dreamy outline of each little thread, caused by the movements of the innumerable hairs investing them. The hairs or cilia themselves are not visible, owing to their extreme tenuity, but the waves they make in the water can be plainly seen. So many thousands of these cilia are simultaneously moving upward on the outer sides of the threads, and downward upon their inner sides, that they force the water along in strong currents from the exterior down toward the bottom of the open-work vase where the mouth lies. The meeting of these currents coming from all sides at once creates a whirlpool, in which hundreds of careless animalcules are continually caught and transported to the mouth. This being placed at the centre of the vortex catches all the objects entrapped by the current above, and it has also, unfortunately for its helpless prey, a stomach beneath, which is indeed "an abyss no riches can fill." The thousands of sleepless cilia are day and night constantly in motion, drawing into the throat an endless stream of food. The stomach below is equally active, and thus all the organs work harmoniously, like machinery driven by steam, untiringly capturing and digesting the food, which, when assimilated, supplies the waste occasioned by the great activity of these parts. The threads or tentacles also prove useful in many other ways. They can twist together with incalculable rapidity, barring out any objectionable animal which may manifest a disposition to pry into the crown; or each one can by itself bend over and eject annoying particles; or, if the throat need a little cleaning, force its way down the tube and clear it, by pushing into the stomach whatever may be clinging to the sides. They are most amusing, however, in the angry pettishness they occasionally exhibit toward intruding neighbours. First comes an admonitory push, then a harder one, if the first is not successful, and lastly, unmistakeable blows administered with vicious rapidity by many threads in unison. Sometimes a "big fish" enters the crown in the shape of an animated speck, perceptible only when magnified twenty or thirty times its own size; then the sensitive tips of the threads curve together and imprison the coveted morsel. Caged thus in a living net, and unable to break through the bars, it is soon exhausted by the power of the miniature maelstrom, and swept, in spite of many fruitless struggles, down into the gaping mouth.

On the exterior of the tentacles, reaching about halfway up their sides, is a thin veil, looped up and hanging gracefully between them like a delicate ruffle with pointed folds. Between this veil and the dark brown cell is the pellucid tube, and through its walls we can examine the internal organs. Directly under the tongue-like projection of the disc or epistome is the nervous mass, which takes the place of a brain in all the polyzoa. It has nerves leading to the throat, the stomach and intestine, besides two branches that go to the disc, and distribute those minute nervous tendrils which endow them with such acute sensibility. The epistome, or false tongue above the mouth, being only a fold of the disc, is hollow. The nerve-mass retreats into this cavity at will, probably by means of minute muscular fibres; and in this position also seeks security from injurious pressure, while the polyzoon is crowded within the shelter of its cell. Thus the epistome, in addition to its other multifarious uses, serves at times as a brain box.

The organs of digestion hang from the disc above, occupying the centre of the tube, and floating freely in the rapidly moving blood. The throat is closed at the lower end by a valve, which opens into a gourd-shaped sack, the stomach; close by this is another valve which opens from the stomach into the intestine. The last is a canal leading up, side by side with the throat, for a short distance, but finally bending away from it, and opening externally through an aperture in the pellucid tube, just below the base of the ruffle, and not far from the mouth.

Though the walls of these organs are variously tinted, they are not opaque, and, therefore, while not interfering materially with the view through the clearer substance of the tube, add greatly to its beauty. The yellowish throat, the stomach striped with dark brown, and the intestine, also dark brown, form a coloured axis, giving a life-like warmth to the airy delicacy of the surrounding film.

We have seen by what strange methods the food is captured, but this is not more curious than the way in which it is digested. A throatful, for we cannot say mouthful, is no sooner admitted to the stomach than it is rolled up and down from one end to the other with great violence. The walls of this organ take on a circular constriction, which pursues the morsel without intermission, forcing it first to one end and then back again to the other, from which it entered, until the particles are all crushed and reduced to a pulp. These violent convulsions also serve another purpose; they squeeze the nutritious matter, resulting from digestion, out through the membranes of the stomach into the cavity of the tube and cell, where it becomes mingled with the blood, and is carried off to give health and strength to the body.

We have spoken of the plumes being withdrawn in one of the colonies, and, though it has been only casually mentioned, this habit is the greatest obstacle to the observer while endeavouring to study their form. If the table be shaken ever so lightly, every unfolded crown vanishes, and often half-an-hour or more elapses before continued quiet allures them forth.

All the finely proportioned transparent parts are balanced upon a fold of the wall of the tube, which is retained in its place inside of the cell by many muscles, like fine hairs, attached by one end to the fold, and by the other to the cell wall. A continuation of the fold-membrane carpets the whole interior of the cell, and to it are attached near the lower end the muscular fibres which drag the crown and the more delicate external parts into its shelter at the approach of danger. The muscles are arranged in great broad bands rising in two trunks, each one spreading out above into numerous smaller branches. These branches are attached to the stomach, throat and disc near the mouth, and one of them to the wall of the tube not far from the base of the veil. They are diaphanous, but their delicate aspect is no measure of their strength. They jerk the crown and outer tube within the cell quicker than the eye can follow them; and it is a curious fact, that after the movement is completed and they are safely ensconced, the fibres are not content to rest, but still keep up a lively motion, writhing and twisting like bundles of minute worms.

The tentacles all the while lie gathered closely together in the sheath, formed for them by the tube, which has been doubled upon itself inside of the cell like the finger of a glove inverted within the empty palm. When once more ready to emerge, the opening of the cell, which has been contracted by a circular band of muscle, like the mouth of a bag drawn up with a string, relaxes and permits the ends of the tentacles to protrude. These warily search for the cause of the previous alarm, and, if no hostile movements betray the presence of an enemy, the whole bundle slowly and cautiously follows, halts a moment, and then confidently unfolds its circlet of sentient threads. The polyzoon reasons from the impression made upon these feelers, and cannot be induced to expose itself until thoroughly satisfied, by their exquisite sense of touch, that no danger lurks near its retreat.

Strange to say these plant-like creatures,singly mere animated pouches containing stomachs, show greater nervous sensibility than many more highly organised animals. They continually surprise us by actions which exhibit caution, fear, and anger to a remarkable extent, and imply a degree of complication in their relations, both social and physical, which the simplicity of the organisation, and the limited sphere of its exercise render doubly interesting to the philosophical observer.—*American Naturalist*, April, 1867.

FUNGI AS FOOD.

THE Mouceron may well be placed at the head of our list, as it is one of the earliest and the best of the Mushroom tribe. It usually appears the first week in May on Grass downs, and in poorer meadows growing in rings which vary in size to more than 30 yards in diameter, as we have seen on Salisbury Plain. At this season no other "fairy ring" Agaric has made its appearance, so that it is next to impossible to confound it with any other species. It occurs plentifully in the meadows in front of the Agricultural College at Cirencester, and is the one upon which Professor Way experimented for his paper on Fairy Rings, though the species was erroneously referred to as the A. Georgii.

While at the College I was much interested in the subject, and yearly watched the coming of the Fungus with some anxiety, and seldom for as many as fifteen years was it later in making its appearance than the end of the second week in May, its most usual time being the first week. I soon saw that the species was the A. prunulus, so well described by Dr. Badham, being identical with the Italian plant of which he quaintly observes that little baskets of the earlier examples are sent as "presents to lawyers and fees to medical men," and that its Italian name of Fungi de Genoa denotes superior excellence, as with our Kentish Cherries, Battersea Asparagus, &c.; and further, that in the dried state it is sold at Italian warehouses at the enormous rate of 6d. per ounce. Seeing, then, that it was described as so good, we procured a dish, and got them cooked for the Professor's table, and, as in the case of the burnt pig so admirably described by Charles Lamb, the perfume was so agreeable, that the whole College was seduced into eating them; the students gathered them, and prevailed on the cook to send them up for supper; and so plentiful were they that enough were gathered for near upon 100 people, all whom ate of them heartily without a single case of indigestion.

In 1849 the Cotteswold Naturalists' Club May Meeting was fixed for Swindon Station; to this I took a basket of this A. prunulus, which were there cooked for breakfast, and in such perfection that the tempting smell wooed all to partake of them, though for the first time in their lives—all except myself, who was so busy making tea that the dish was emptied before that important process was over. I afterwards learned that at this establishment was an Italian cook, who, upon, seeing my funguses, gave vent to his joy in the kitchen, and went into rhapsodies upon "verdant Italy."

From this time the members of the Club and others in Gloucestershire and elsewhere amongst my old pupils, ate this Fungus freely. I know of no better way to cook them than with a little butter, pepper, and salt, to grill them like the common Mushroom; or they may be fried with thin slices of bacon. A lady friend of mine once directed some to be stewed; how the process was performed I cannot say, but the result was that the Fungus had the appearance of bits of soddened leather breeches; and so it is to be feared that the difference between the provider of meat and of cooks, will cause the party who thus tried to partake of them to consider them mere toadstools as long as they live.

The Champignon is also a fairy ring species. making its appearance from August to October, and even until near Christmas in mild weather. It is common on lawns and in pastures and sometimes occurs in clusters on banks. Its rings are usually small, but, as I have this year seen, are so thick that many pounds may be gathered in a small space of time; and the Rev. M. J. Berkeley says of it no more than I have constantly experienced:—"When of a good size and quickly grown, it is perhaps the best of all Fungi for the table, whether carefully fried, or stewed with an admixture of finely minced herbs, and a minute portion of garlic. It is, at the same time, tender and easy of digestion: and when its use is known, and character ascertained, no species may be used with less fear. It is so common in some districts that bushels may be gathered in a day." They are exquisite if served on buttered toast with game, or poultry of all kinds.

The Common Mushroom is so well-known that, in spite of all that may be said to the contrary, I have never known the veriest bumpkin make a mistake in regard to it. Its flavour is so rich that all classes of people in this country esteem it as a rare "dainty dish even "to set before a king," and in its favour, except with a few, all other Funguses are cast aside. It is, however, a curious fact that it is despised on the Continent, so much so as not to be permitted to enter the fungus market. I recollect questioning the Prince of Canino on this matter, at one of the meetings of the British Association, when he informed me that it really was a poisonous species; and that it is so with some people, perhaps in peculiar conditions of the digestive system, I can fully confirm.

Few amongst us but have noticed towards autumn the ominous newspaper paragraph—"Poisoned by Toadstools." Now in some of these cases I have inquired into the species, and never did I detect an error; but take an example of the present season: A farmer and his wife partook heartily of Mushrooms for their supper, of which I found the former had taken the "lion's share." He thought himself dying in the night, as he supposed from eating toadstools, but in this case I not only ascertained that his fungus was the best variety of this Mushroom, but I partook of them with great relish, as his wife had done, without any ill-effects. I conclude then with regard to this fungus that it should always be taken with moderation, and only during the period that its gills preserve their fresh pink hue. The smaller pickled "buttons" are always good, and I have never heard of ill-effects from them.—J.B., *Gardeners' Chron.*, May 4th.

THE STICKLEBACK.

The Stickleback is one of our commonest British fishes, and is known in different parts of England under the names of tittlebat, pricklefish, and sharplin. It belongs to the vast order of the spine-finned fishes.

It is a most bold and lively little fish, hardly knowing fear, pugnacious to an absurd degree, and remarkably interesting in its habits. Even more voracious than the perch, it renders great service in keeping within due bounds the many aquatic and terrestrial insects which, although performing their indispensable duties in the world, are so extremely prolific, that they would render the country uninhabitable were they allowed to increase without some check.

Any one can catch a stickleback without rod, float, or even hook. All that is needful is to repair to the nearest streamlet, armed with a yard or two of thread and a walking-stick. Thin twine will answer very well instead of the thread, and even the stick is not absolutely needed. Having proceeded, thus equipped, to the bank of the stream, a worm may be picked out of the ground, tied by the middle to the thread, and thrown quite at random into the water.

The sticklebacks will not be in the least frightened by the splash, but rather rejoice in it, as calling their attention to food. In a moment the worm will be the centre of a contending mass of little fishes, rolling over and over, struggling to the utmost of their power, and entirely hiding the worm from sight. Now let the angler quickly lift the bait out of the water, swing it on shore, and he will almost certainly find that he has captured two sticklebacks, one hanging to each end of the worm and retaining its hold so perseveringly, that it can hardly be induced to relinquish its gripe. This process may be repeated at pleasure, and as the sticklebacks never seem to learn wisdom, a large store may soon be accumulated. This is a good way of stocking an aquarium, as the strongest and liveliest fish are sure to be caught first.

"I have caught them," writes Mr. Wood, in his invaluable "Natural History," "by hundreds in a common butterfly-net, by the simple stratagem of lowering the net into the water dangling the worm over the ring, and by degrees lowering the worm and raising the net until I had the whole flock within the meshes." Mr. Wood continues: "Should my reader be disposed to place his newly-captured specimens in an aquarium, he must make up his mind that they will fight desperately at first, and until they have satisfactorily settled the championship of the tank their intercourse will be of the most aggressive character. Never were such creatures to fight as the sticklebacks, for they will even go out of their way to attack anything which they think may possibly offend them, and they have no more hesitation in charging at a human being than at one of their own species. I have known one of these belligerent fish make repeated dashes at my walking-stick, knocking his nose so hard against his inanimate antagonist, that he inflicted a perceptible jar upon it, and, in spite of the blows which his nose must have suffered, returning to the combat time after time with undiminished spirit. These combats are most common about the breeding season, when every adult stickleback challenges every other of his own sex, and they do little but fight from morning to evening. They are as jealous as they are courageous, and will not allow another fish to pass within a certain distance of their home without darting out and offering battle."

Any one may see these spirited little combats by quietly watching the inhabitants of a clear streamlet on a summer day. The two antagonists dart at each other with spears in rest, snap at each other's gills or head, and retain their grasps with the tenacity of a bull-dog. They whirl round and round in the water, they drop, feint, attack, and retreat with astonishing quickness, until one confesses himself beaten, and makes off for shelter, the conqueror snapping at its tail, and inflicting a parting bite.

"Then is the time to see the triumphant little creature in all the glory of his radiant apparel; for with his conquest he assumes the victor's crown; his back glows with shining green, his sides and head are glorious with gold and scarlet, and his belly is silvery white. It is a little creature certainly, but even among the brilliant inhabitants of the southern seas, a more gorgeously coloured fish could hardly be found. If the conqueror stickleback could only be enlarged to the size of a full grown perch or roach, it would excite the greatest admiration. It is curious that the vanquished antagonist loses in brilliance as much as the conqueror has gained; he sneaks off ignominously after his defeat, and hides himself, dull and sombre, until the time comes when he too may conquer in fight, and proudly wear the gold and scarlet insignia of victory."

These struggles are not only for mastery, but are in so far praiseworthy, that they are waged in defence of home and family.

As a rule, fishes display but little architectural genius, their anatomical construction debarring them from raising any but the simplest edifice. A fish has but one tool, its mouth, and even this instrument is of very limited capacity. Still, although the nest which a fish can make is necessarily of a slight and rude character, there are some members of that class which construct homes which deserve the name; and the sticklebacks certainly furnish the best instances of fish architecture.

They make their nests of the delicate vegetation that is found in fresh water, and will carry materials from some little distance in order to complete the home. They do not, however, range to any great extent, because they would intrude upon the preserve of some other fish, and be ruthlessly driven away.

When the male stickleback has fixed upon a spot for his nest, he seems to consider a certain area around as his own especial property, and will not suffer any other fish to intrude within its limits. His boldness is astonishing; for he will dash at a fish of ten times his size, and, by dint of his fierce onset and his bristling spears, drive the enemy away. Even if a stick be placed within the sacred circle, he will dart at it, repeating the assault as often as the stick may trespass upon his domains. Within this limit, therefore, he must seek materials for his nest, as he can hardly move for six inches beyond it without intruding upon the grounds of another fish. This right of property only seems to extend along the banks and a few inches outwards, the centre of the stream or ditch being common property. Along the bank, however, where vegetation is most luxuriant, there is scarcely a foot of space that is not occupied by some stickleback, and jealously guarded by him.

Although the nests of the stickleback are plentiful enough, they are not so familiar to the public as might be expected—principally because they are very conspicuous; and few of the uninitiated would know what they were, even if they were pointed out. Being of such very delicate materials, and but loosely hung together, they will not retain their form when removed from the water, but fall together in an undistinguishable mass, like a coil of tangled thread that had been soaked in water for a few weeks.

The materials of which the nest is made are extremely variable, but they are always constructed so as to harmonize with the surrounding objects, and thus to escape ordinary observation. Sometimes it is made of bits of grass which have been blown into the river, sometimes of straws, and sometimes of growing plants. The object of the nest is evident enough when the habits of the stickleback are considered. As is the case with many other fish, there are no more determined destroyers of stickleback eggs than the sticklebacks themselves; and the nests are evidently constructed for the purpose of affording a resting-place for the eggs until they are hatched. If a few of these nests be removed from the water in a net, and the eggs thrown into the stream, the sticklebacks rush at them from all sides, and fight for them like boys scrambling for half-pence. The eggs are very small, barely the size of dust-shot, and are yellow when first placed in the nets but deepen in colour as they approach maturity.

Sometimes the stickleback becomes rather eccentric in its architecture, and builds in very curious situations. Mr. Couch, the well-known ichthyologist, mentions a case where a pair of sticklebacks had made their nests "in the loose end of a rope, from which the separated strands hung out about a yard from the surface, over a depth of four or five fathoms, and to which the materials could only have been brought, of course in the mouth of the fish, from a distance of about thirty feet. They were formed of the usual aggregation of the finer sorts of green and red seaweed, but they were so matted together in the hollow formed by the untwisted strands of the rope, that the mass constituted an oblong ball, of nearly the size of the fish, in which had been deposited the scattered assemblage of spawn, and which was bound into shape with a thread of animal substance, which was passed through and through in various directions, while the rope itself formed an outside covering to the whole."—*Our Own Fireside.*

HEAT OF THE SUN.

YOU will find in Herschel's Astronomy an account of the curious speculations which have been made as to the generation of heat in the sun, and also some calculations of the amount of heat which it sends out in any given time. One is that each square yard of surface gives out every hour rather more than would be got by burning six tons of coal, and from that you may deduce the following calculation. Six tons of coal weigh about as much as seven cubic yards of the sun's average substance; that is, if the sun were a great coal he would have to burn down seven yards an hour to give out the heat that he does, or thirty-five miles deep would be burnt off him in a year, which is about a 4,000th part of his whole bulk. The consequence is that the sun would have been burnt away into ashes, which would burn no more (though all his weight would remain there) in 4,000 years. We may be quite sure then that the sun's heat is not kept up by the burning of his own substance, at any rate. Another mode of keeping up the sun's heat has lately been imagined, which is remarkable for its ingenuity, if not for its probability. It is that the heat is due to a constant shower of meteroic stones falling all round the sun with the velocity they would fall with, if they once got near enough for his attraction to overpower their velocity in another direction. You may soon satisfy yourself that blows will produce heat by holding a nail in your finger while you hammer it well on an anvil, in fact, it can be hammered hot enough to light a match. It is calculated that if stones as heavy as granite fell all over the sun twelve feet thick in a year, with the greatest possible velocity (384 miles a second) from the sun's attraction, they would maintain the actual heat; or if they fell with the more probable velocity of small planets dragged out of their orbits sideways into the sun, or 270 miles a second, 24 feet of thickness a year would be required; and as granite is about two and a half times as heavy as the average matter of the sun, that would be equal to an addition of a mile to the sun's diameter every fifty years, or an increase of the sun's weight or mass by about a 7,000th part in the 2,000 years since tolerably accurate astronomical observations began to be recorded. And that is enough to have shortened the year by more than half-an-hour, according to the law by which the length of the year depends on the sun's mass and distance. But the year has not shortened, for even the four seconds mentioned are no shortening of the absolute revolution of the earth, but only a slow increase of precession of the equinoxes. This last objection certainly would fail so far as the earth is concerned, but would still hold as to Mercury and Venus if the whole store of meteors, or little planets, or asteroids which fall in the sun, is equally scattered round the sun within the orbit of the earth, because then the attraction of the meteors and sun together, or bodies outside them all, is the same as if they were concentrated in the sun. Accordingly, it is next supposed that this store of meteors is a certain nebulous and faintly luminous mass called the zodi. acal light, sometimes looking like the milky way which surrounds the sun in the form of a lens or very flat spheroid, extending nearly or quite as far as the orbit of the earth. Then it is assumed that a sufficient number of the asteroids are continually missing their way (as we may say) and getting dragged into the sun and swallowed up for food to maintain his heat by their concussion. The cause of their so missing their way is imagined to be a certain resisting medium called æther, which there really is reason to believe fills all space, and must in time gradually contract the orbit of everything which moves in it. Not that there is the least evidence of any solid body in the universe having yet been at all affected in its orbit by such resisting medium, though one comet is believed to have had its period shortened in that way. You will see how extremely unlike comets are to granite or meterotic stones in density. Nor do the comets themselves, though very sensitive to disturbance by reason of their lightness, appear to be ever disturbed by passing right through that mass of zodiacal light, about 180,000,000 miles wide, full of real or supposed meteors or asteroids. The crossing of two streams of meteors by the earth every August and November, gives no help to the theory of the sun being supplied from a store within the earth's orbit. Those are revolving round the sun in periods not very different from the earth's. Every now and then there have been great flashes of light in the sun, which may possibly have come from some such concussion. Otherwise there are no visible indications of this rain of stones upon the sun, but perhaps that could hardly be expected, for if a whole year's supply came in one piece, it would be smaller than the moon, which could not be seen at that distance in the brightness of the sun. In this state of things it is not surprising that the meteroic hypothesis is not yet accepted by astronomers as the real explanation of the sun's heat, though no more probable one has been invented.

Leaving these speculations into unknown causes, Sir J. Herschel gives us another measure which has been experimentally obtained of the quantity of the sun's light and heat by himself and others, viz., that the light of any piece of his surface is 146 times greater than that of an equal surface of lime under the oxy-hydrogen flame, which gives the most intense light and heat we can make, and that the heat is enough to melt fourteen yards thick of ice laid all over the surface of the sun in a minute. From this you may easily calculate that that shell of ice round the sun would be about three-fifths of the size of the earth, and, therefore, the whole heat of the sun is enough to melt an earth of ice in less than two minutes; and it would boil all that water in two minutes more and turn it all into steam in a quarter of an hour from the time it was first applied to the ice. Of course the earth receives only a very small part of all the heat sent off by the sun. Indeed, less than the 2,000-millionth part, all the planets together only a 227-millionth. So although we have so much difficulty in finding out how the sun's heat is kept up, he can afford to waste (as far as we know) many million times as much as all his satellites can use. The earth receives as much heat in a year as would melt 100 feet thick of ice, or boil 66 miles deep of water all over the globe.—*Denison's Astronomy Without Mathematics.*

ORDEAL BEAN OF CALABAR.

THE Calabar ordeal bean, *Physostigma venenosum* of Professor Balfour, comes to us, as its name intimates, from Calabar, a name by which Europeans designate a small but influential tribe of negroes inhabiting the left bank of the Old Calabar River, which flows into the Bight of Biafra, west coast of Africa, immediately to the north of the island of Fernando Po. By the natives of Calabar the bean is called *esere*—has long been known to them, and has long been used by them as an ordeal, for the purpose of detecting and extirpating the superstitious crime of witchcraft.

The plant from which the beans are obtained is a *climber*, attaining often to very considerable dimensions, and frequently found growing on the banks of the river, at the water's edge, where it climbs the overhanging trees, almost entirely masking their foliage with its own rich festoons. About the month of August it makes an abundant display of pretty pink and white papilionaceous flowers, of which, however, comparatively few come to maturity. The fruit which is ripe in November is a pod not unlike that of our own horsebeans, containing rarely three, commonly one or two beans. On the 29th October, 1862, rather too early in the season, perhaps, I gathered the fruit of two considerable plants, one of them having a stem an inch and a half or two inches in diameter, and at its lower part towards the root so twisted upon itself as to simulate a cable of three or our inches in diameter. From the first of these plants 230 pods were procured, representing about 170 clusters of flowers, and yielding exactly 375 beans. From the other plant the number of pods obtained was 261, representing at the same average about 190 clusters of flowers, and yielding exactly 430 beans. These beans when gathered were still full of moisture, nearly as large again as the dry bean, of a dark grey colour—not the dark chocolate brown which they ultimately acquire—and they averaged in weight 54 beans to the pound.

The natives of Calabar obtain their supply from the shores of the river, where the beans are cast up in sufficient quantity to serve their purpose. In former days every free man of the least consequence in his village kept a stock in hand, so as to be able to contribute his quota as occasions of public trial by the ordeal might require; or to test the loyalty of suspected wives or slaves of his own; or even in case of his being threatened with a public trial, to put himself quietly to the proof, with proper remedies at hand, so as to obtain a prognosis that might encourage him to face the ordeal with hopes of an honourable acquittal, or else warn him in time to flee from certain and ignominious death. And yet it is a curious fact, that hardly any of these people know anything at all of the plant; indeed, one may safely venture to say that none of them are able to identify the plant in new situations, except by the aid of the fruit.

According to Dr. Fraser, of the Edinburgh University, who has written on the subject, the dry bark of the plant is quite harmless, though the sap which exudes from it when a fresh part is wounded, is first astringent and then acrid to the taste. The leaves also are quite harmless. Goats devour them greedily without any deleterious effects ensuing.

In publicly administering the Calabar bean as an ordeal, it is commonly given both by the mouth and in the form of a clyster. The suspected person has some entire beans handed to him, which he is compelled to eat up in this condition. Meanwhile, others are bruised in a mortar or on a slab, and being well mixed with water, one part is taken as a draught and the rest administered as an enema. If, after vomiting and purging, when the ordeal has been given in both forms, the person recovers, he is declared to be innocent and harmless, if not he is pronounced guilty, and the community congratulates itself on having thus avenged past and prevented future mischief.

It would be very gratifying indeed to be able to say, though it were only now after the presence of missionaries amongst them for some twenty years, that the negroes of Calabar have quite abandoned this stupid and most fatal custom—a custom by which formerly hundreds of lives were sacrificed annually, and by which many still occasionally perish.—*Dr. E. Watson in the Edinburgh Medical Journal for May*, 1867.

Wild Tribes of India.

The most remarkable of all the wild tribes of India are those inhabiting the mountain-range of Southern India, well known as the Nilgharries, a Sanskrit compound which signifies "Blue Mountains." The Nilgharries lie between the tenth and eleventh degrees of latitude, embrace an area of about six hundred square miles, contain plateaus, some of which attain the elevation of from five thousand to seven thousand feet, while the highest mountain peak is eight thousand seven hundred feet above the sea-level.

The inhabitants of the range consist of five different tribes, four of which have each their own separate and independent language, while the fifth, the most numerous and the most industrious, speaks the Cenarese tongue, that of their nearest civilised neighbours; a fact from which we may be disposed to consider them as stranger immigrants. It is this tribe alone which has adopted the manners, institutions, and religion of the Brahmins. All the five tribes possess the usual features and bodily form of the Hindus of Southern India; but this character is most remarkably pronounced in the small tribe called the Todars, whose number is computed not to exceed six hundred, and who occupy the highest of the mountain uplands. They are herdsmen, as their name, which is the corruption of a Tamil word having this meaning, implies; their only cattle being the buffalo, the milk of which forms their chief ailment. All European observers agree in considering the Todars as a handsome race, above the average stature of Hindus, with regular features and elevated countenances—in short, Greeks with black skins. But the same account might be very faithfully given of several other Hindu peoples; such, for example, as the Seiks and the Cashmirians.

The believers in the Aryan theory are much puzzled by the Todars. They ought, were they aborigines, to have, according to the theory, Negroid features; but, on the contrary, they happen to have European, and therefore, in despite of their small numbers, their low social status, and their geographical position in a remote corner of India difficult of access, they pronounce them to be a race of foreign Caucasian conquerors, without being able even to guess of whom they came, where they came from, or when they settled in the upper plateau of the isolated Nilgharri mountains.

It is an opinion very generally entertained by Indian ethnologists, that the races which they suppose to be the aborigines of India partake of a negro character, in contradistinction to the civilised people of the low lands; but this is a notion for which I am satisfied there is no ground whatever. Throughout the continent of India—indeed, throughout the entire continent of Asia—no Negro or Negroid race has ever been found to exist, the only exception being a few pigmy Negroes in the interior of the Malay peninsula, which is rather a portion of the neighbouring archipelago than of the Asiatic continent. Wherever Negritos or Negroid races really exist, their presence is unmistakably pronounced, as in the case of the Andaman islands, in the mountains of the Malay peninsula, in several of the Philippine islands, and in the long range of islands which extends from New Guinea to the Fiji groupe in the Southern Pacific. Everywhere their peculiar physical character is clearly indicated. Sometimes they have whole islands to themselves, as in the instances of the Andamans, New Guinea, and some of the islands of the Southern Pacific; but even when they are joint occupants with other races, as in the Malayan peninsula and the Philippines, they dwell isolated in the mountains, never intermixing with the fairer and more highly endowed races their neighbours. All, it will be seen, that so careful and faithful an observer as Colonel Dalton can say of his most ill-favoured race of mountaineers, the Oraons, is that he has "seen amongst them heads that in woolly crispness of the hair completed the similitude of the Oraons to the Negro." He finds no such resemblance in the better looking Moondah tribe. "When," says he, "it varies from the Aryan or Caucasian type, it appears to me rather to merge into the Mongolian than the Negro." No doubt such heads and features as Colonel Dalton describes would be found among the Kols; but they are also to be found in every race of man. Thus Colonel Dalton would certainly find occasionally among his own countrymen heads and faces that, with the addition of a black skin, would bear a considerable resemblance to an African Negro, and other heads which, with a yellow skin superadded, might readily be mistaken for Mongols. Rules are not to be deduced from exceptions.—*Paper read before the Ethnological Society.*

Ants.

The females, who usually occupy a special part of the colony, seem, contrary to the views of those who slander the gentler sex, to live together in the most perfect harmony. In course of time they lay a number of extremely minute, white, spherical eggs, and with this operation end their duties to the colony. To the workers is consigned the important labour of incubating the eggs, and rearing and nursing the young. They take charge of the ova the moment they are laid, and remove them to chambers specially arranged for their reception. A certain amount of warmth is required for the development of the eggs into larvæ, and this is procured by removing the ova in fine weather from the cells, in which they have been detained, into the open air. There they are exposed to the sun's rays—care being taken that too high a temperature is not imparted to them—for some time, and then the ever-active workers remove them to the nurseries. It is this process we see going on in summer time when we disturb an ant-hill. Myriads of the busy little insects may be seen rushing about laden with little white grain-like bodies, of which they take the greatest care, and eventually succeed in carrying beneath the surface. These white, grain-like bodies are the larvæ, and as some of the earlier observers fancied they were grains of cereals, seeds, and such like, the ant acquired a reputation for thriftiness and providence which it certainly does not deserve. In about fifteen days the eggs are hatched, and the larvæ make their appearance as little whitish, semi-transparent, ovoid worms. They possess a head and body, the latter being divided into a number of rings or segments which are unprovided with feet. Their mouth is a sort of retractile proboscis, in which we may see the rudiments of the future mandibles, but at this period of their existence it is only employed for sucking. They feed upon the peculiar honey-like fluid provided for them by the workers, who prepare it in their stomachs, and then disgorge it for the nourishment of the young. The most sedulous attention is paid by the worker-nurses to the larvæ, the latter, as we have already stated, being constantly removed from their underground chambers to the outer surface of the ant-hill, where they receive the genial influence of the sun, and thus further metamorphosis. The nurses, too, advance this phenomenon by gently irritating, rubbing, and distending the skin of the larva with their palpi. Soon this metamorphosis takes place. The little larva spins its temporary greyish-yellow silken coffin, and becomes a nymph, or pupa. Gradually beneath the veil under which Nature conceals her mysterious operations, the larva is transformed into a nearly perfect ant, the proboscis disappears, and is replaced by a set of horny jaws, the skin changes its colour, assumes a reddish-brown tint, powerful and strangely organized limbs are formed, and the head and appendages increase in complexity of structure. These singular changes all take place, and yet the creature remains motionless and death-like, and when the metamorphosis is complete, the nurses once more commence their labours. They now tear away the curtain and disclose the perfect insect or *imago*, as it is scientifically termed. Nor do they cease their tender exertions. They still continue to watch over the welfare of the new-born, till they are able to take their own place in their own little sphere of existence.

THUNDERSTORMS.

A fearful hailstorm passed over Wakefield on Monday night, May 6th, a little past eight o'clock. It was preceded by singularly vivid and beautiful lightning and by rumbling thunder. The downfall of hail lasted only about ten minutes, but with such impetuosity as has never been remembered. Hailstones the diameter of an inch were far from uncommon, and after the storm was over the ground was covered with others the size of marbles.

At sunset on Friday, May 10th, and at daybreak on Saturday two thunderstorms broke over London, which, although they lasted a short time, were very violent. About seven o'clock on Friday evening the sky became very dark towards the south and west, and was suddenly lighted up by vivid flashes of lightning. They were followed by heavy peals of thunder and gusts of wind and rain. Between eight and nine the storm had cleared away, but a dark cloud stood out in the north-west against a clear sky, and was lighted up at intervals with the most dazzling flashes of sheet lightning. Towards the east and south, where the sky remained cloudy, lightning was also visible, and slight peals of thunder were heard throughout the night. The second storm, which was also accompanied with wind and rain, broke out about five o'clock in the morning of Saturday. The lightning was very brilliant, and was followed by several frightful crashes of thunder; but it does not appear to have caused any serious damage.

In Buckinghamshire the storm of Friday evening was very violent. The goods station at Winslow was partly unroofed by the wind, and 86 panes of glass were broken by the hailstones, some of which, when measured by the police, proved to be five inches in circumference. Similar damage was done at the Swanbourne and Claydon stations. The storm extended to Aylesbury, while it blew down trees and walls and flooded the streets. But it was in the vicinity of Buckingham that most damage was done. In Castle-street and High-street panes were broken in every window.

At Cambridge the storm commenced about eleven o'clock on Friday, and continued at intervals during the day and night. The lightning was very vivid, and many of the by-roads were rendered impassable by the floods. At Barrington, Cambridgeshire, a labourer named Patman was struck by the lightning and killed. He was in a field ploughing with his master's son and four labourers, and when the storm came on, about one o'clock, they all took shelter under an adjacent straw stack. One flash of lightning rendered them all insensible. The others, upon reviving, went to their companion Patman, and found him lifeless, with his shoes, leggings, and hat torn to atoms. He was removed to his lodgings in the village, where an inquest was held in the evening. The deceased was a widower, fifty-six years of age, and had been in Mr. Coleman's employ for about forty years. A boy at work in the same field had the upper portion of one of his shoes cut clean out by the lightning, and a piece of flesh, about the size of a shilling, from under his great toe. A horse was killed by the lightning at Walton's coprolite diggings, near Coldham's-lane, Cambridge.

On Friday evening a sharp storm visited Newcastle and the lower reaches of the Tyne. The lightning struck West House, St. Anthony's, the residence of Mr. Cook, chymical manufacturer. A huge stack of chimneys was knocked down and fell through the roof. It broke the furniture in the rooms through which it passed, and a little girl who was sitting in the drawing-room had one of her shoulders dislocated. Considerable damage was done. Rain fell heavily in the north on Saturday, and in the evening the wind got round from the north and blew somewhat cool.

New Books.

[*Our limited space must of necessity compel us to give but very short notices of new books, but they will perhaps serve as a guide as to what books our readers may ask for at their libraries.*]

Light; its Influence on Life and Health. By Forbes Winslow, M.D. London: Longmans and Co.

In his preface, Dr. Winslow says, the object of this work is to demonstrate the inestimable value of light as an hygienic agent, and to analytically examine its physiological influence in the development of vital phenomena as manifested in the animal and vegetable kingdom. How well the author has fulfilled his task, will be best seen by reading the volume. The reader need not fear any dry disquisition upon the subject. The work from beginning to end is cheerful and lively, and full of information of the greatest value and interest, gathered with great care from a variety of sources.

The first chapter opens with the origin of light, its effects upon the animal and vegetable kingdom. As to its effects upon mankind, we find that where light is not permitted to permeate are to be found bodily deformities, intellectual deterioration, crime, disease, and early death. The total exclusion of the sun's beams from the body (says Dr. Winslow) induces the severer types of green sickness and other anæmic conditions depending upon an impoverished and disordered state of the blood, the general health becomes vitiated, and specific diseases generated —these consequences have been observed in those who labour by night and sleep by day, such as bakers, police-constables, compositors, and more especially amongst miners. We have some facts as to the action of solar light on the discoloration of the skin. Black, brown, and copper-coloured skins are observed amongst those who reside in tropical climates in proportion to the intensity of the solar light, and the degree to which the body is exposed to its influence. It is not perceived amongst those who live in colder regions. Nearer to the pole it assumes a browner cast, as amongst the Laplanders, Esquimaux, and Greenlanders. It is noticeable that the African negroes who live for many months of the year in the shades of the forest lose some of the intense blackness. It is said that the black colour of the negro is less permanent than red or olive tints; the children of copper-coloured parents are so from the moment of birth, whereas with blacks it is six, eight, or ten months before the dark pigment is fully secreted; in some cases the pigment cells are not matured, and then we have what are called spotted negroes; in illness too it may be entirely absorbed, and a white pigment cell developed in its place, thus affording a remarkable illustration of a black person suddenly bleached into a white man. In the "Transactions of the Royal Society" is an account of a woman whose left shoulder, arm, and hand were as black as an African negro's, whilst all the rest of the skin was perfectly white. Upon animals the exclusion of the solar beam produces organic alterations in the visual organs. Certain animals whose natural hue is white, if bred and brought up in darkness become completely altered in texture and colour. The cockroach in its normal state is intensely black; if this insect is taken at an early stage of its existence and carefully reared in darkness, instead of assuming an inky hue, when it arrives at full growth becomes nearly white; the larvæ of most insects that burrow in the earth, plants, or animals, are white from the same cause. Of its influence upon vegetable life some curious facts are recorded. In the spring a potato was left behind in a cellar where some tools had been kept during the winter, and which had only a small aperture at the upper part of one of its sides; the potato which lay in the opposite corner shot out a runner, which first ran twenty feet along the ground, then crept up along the wall and so through the opening by which light was admitted. Some flowers are seen inclining their flowers towards the quarter of the heavens in which the sun is shining. If a leafy shoot of any plant is bent down without injury so as to reverse the usual position of the face of the leaves, the latter will twist upon their petioles and turn their upper surfaces to the light. Plants trained in a dark recess will turn their growing point backwards on the older part of the stem, also twisting round to face the light; plants nurtured in darkness never acquire their natural colour; the rich colour of seaweed found on the surface of the water is owing to its free exposure to light. The second part treats of the lunar ray, the third on the alleged influence of the moon on the insane, the fourth finishes with the hygiene of light.

We have gathered these few notes together to give the reader some idea of the contents of the volume.

Astronomy without Mathematics. By Edmund Beckett Denison, LL.D., Q.C., F.R.A.S. London: Society for Promoting Christian Knowledge.

This is a third edition, considerably enlarged, and going deeper into the subject. The additions chiefly relate to meteors, nebulæ, and stars, the moon's acceleration and other disturbances, the tides and the calculations for Easter in all ages, and a fuller account of the methods of weighing the sun, moon, and planets. The chapter on telescopes has also been enlarged. In this little work the study of astronomy is made as easy as it can be made; and the sale of some 3,000 copies in little more than a year points out the fact that a really popularly-written scientific work is certain to prove a success.

Chemistry, Inorganic and Organic, with Experiments, and a Comparison of Equivalent and Molecular Formulæ. By Charles Loudon Bloxam. Churchill and Sons.

Undoubtedly one of the most useful works that has been issued for some time. The description of the elements and their compounds is given in a very clear and simple manner. Mr. Bloxam has adhered to the simple rule of explaining the chemical changes by symbols, representing the combining weights of the elements. In nearly every case the student is referred to an illustrative experiment, and is greatly aided by many excellent illustrations, displaying the apparatus employed and mode of manipulation.

At Home in the Wilderness. By John Keast Lord, F.Z.S., late Naturalist to the British North American Boundary Commission; author of "The Naturalist in Vancouver Island and British Columbia." Hardwicke, 192, Piccadilly.

Mr. J. K. Lord has here given us a capital little volume, which will be found to be of the greatest value as a hand-book for emigrants, and indeed for all, who whether for pleasure or business, are likely at any time to find themselves in the wilderness—nor are these the only ones who will derive benefit from a perusal—there are many hints and suggestions that will be found as valuable to the country gentleman as the traveller. It is nicely got up, well illustrated where requisite, and published at a price that will suit most pockets.

NEW PERIODICALS.

Routledge's Illustrated Natural History of Man in all Countries of the World. By the Rev. J. G. Wood, M.A., F.L.S., &c. With Illustrations by Wolfe, Zwecker, Keyl, Houghton, etc. Part I. Monthly. Price 1s.

This very handsome work is intended to form a companion to the well known and popular "Natural History" already published. It will treat of mankind geographically, commencing at the great southern points of the world, and proceeding northwards through each country. Abstract, ethnological, or anthropological theories will be avoided. The present part commences with a description of the great Kaffir race, and is extremely interesting. The following is a description of Goza, the well-known Zulu chief:—

He is one of the most powerful chiefs of the Zulu tribe, and can at any moment summon into the field his five or six thousand trained and armed warriors; yet in ordinary life he is not to be distinguished from the meanest of his subjects by any distinction of dress. An experienced eye would, however, detect his rank at a single glance, even though he were not clad in his "tails." He is fat—and none but chiefs are fat in Kaffirland; in fact none but chiefs have the opportunity, because the inferior men are forced to such constantly active employment, and live on such irregular nourishment, that they have no opportunity of accumulating fat.

But a chief has nothing whatever to do except to give his orders, and if those orders are within human capacity they will be executed. Tchaka once ordered his warriors to catch a lion with their unarmed hands, and they did it, losing of course many of their number in the exploit. The chief can eat beef and porridge all day long if he likes, and he mostly does like. Also he can drink as much beer as he chooses, and always has a large vessel at hand full of that beverage. Panda, the King of the Zulu tribes, was notable for being so fat that he could hardly waddle.

As to Goza, he is a wealthy man, possessing vast herds of cattle, besides a great number of wives, who as far as can be judged by their portraits are not beautiful, according to European ideas of beauty, but are each representatives of a considerable number of cows. He wields undisputed sway over many thousands of subjects, and takes tribute from them; yet he dresses on ordinary occasions like one of his own subjects, and his house is just one of the ordinary huts of which a village is composed. When he wishes to appear officially he alters his style of dress, and makes really a splendid appearance in all the pomp of barbaric magnificence. Also when he mixes with civilization he likes to be civilized in dress, and makes his appearance dressed as an Englishman in a silk hat, a scarlet coat, and jack boots, and attended in his rides by an aide-de-camp dressed in a white-plumed cocked hat and nothing else.

Pigeons, their Structure, Habits, and Varieties. By W. B. Tegetmeier, F.Z.S. Parts I. and II. London: Routledge and Sons.

This work is intended to give an account of the structure, habits, and food of the wild original of our domestic breeds; the consideration of the pigeon as a domestic animal, including characteristics of all the varieties, the practical management of the several breeds will be fully treated. It is beautifully illustrated in colours, drawn from life by Harrison Weir. The first and second parts contain pictures of eight different sorts—turbines, jacobites, nuns, swallows, fullbacks, fantails, blue brunswicks, and black priests. It will be completed in eight shilling parts, and when finished will form a very handsome volume similar to Mr. Tegetmeier's well-known poultry book.

The Laboratory. A Weekly Record of Scientific Research. Weekly. Price 6d.

FRENCH AND GERMAN WORKS.

Les Saisons, Etudes de la Nature. Par L. Hoefer. Paris and London: L. Hachette and Co.

In this work Dr. L. Hoefer has collected together, and published under the title *Les Saisons*, various natural-history sketches which came out in the *Cosmos*, the *Magasin Pittoresque*, and other popular scientific journals. It is of a strictly elementary character. Each of the four divisions forms, in its turn, two sections, which take the observer successively to the realms of astronomy and to those of natural history properly so called—the latter supplying observations for four different days.

L'Année Scientifique et Industrielle. Par L. Figuier. 11e Année. Paris and London: L. Hachette and Co.

A *résumé* of scientific literature for the year. The several items of astronomy, natural philosophy, meteorology, chemistry, nautical science, statistics, natural history, hygiene, and agriculture—the transactions of learned societies, and a very complete meteorological list—supply M. Figuier with ample materials for his useful volume.

Allgemeiner Missions-Atlas nach Originalquellen. Bearbeitet von Dr. R. Grundemann. Gotha: Perthes. London: Asher and Co.

A general atlas of missionary stations all over the world, with an accompanying text descriptive of their situation and present condition. It is one of the many valuable contributions for which science is indebted to missionary enterprise. The first part contains seven maps, comprising the western coast of Africa from the Gambia to the Gaboon.

L'Oiseau. Par J. Michelet. Hutième édition, illustrée de 210 vignettes sur bois, dessinée par H. Giacomelli: Librairie de L. Hachette et Cie. 1867.

This is the eighth edition of *L'Oiseau* by Michelet, illustrated by H. Giacomelli, whose ornamental designs in the columns of Doré's Bible have been favourably noticed. In the present work he has been particularly happy in his choice of subjects, and the reader will gaze with pleasure upon meadows, wayside brooks, and sunny cottage gardens, made more lively by the presence of some of the best known specimens of the feathered tribe.

Grottes et Cavernes. Par Ad Badin. (Bibliotheque des Merveilles). Paris and London: L. Hachette and Co.

An interesting work on the most celebrated grottos and caverns throughout the globe, giving a clear account of the natural and scientific phenomena which may be observed in them—stalactites, fossils, ice deposits, chemical formations, &c. Woodcuts are plentifully supplied, and are remarkable for their neatness and accuracy.

WORKS RECENTLY PUBLISHED-

The Management of Bees. By W. J. PETTITT. Second and enlarged edition, with a catalogue of the most modern and approved Hives and Bee-Houses. Copiously illustrated. 8vo, cloth gilt, 1s 6d. Dover: W. J. Pettitt, Snargate Apiary.

A Manual of British Butterflies and Moths. By H. T. Stainton, F.L.S. Containing Descriptions of nearly Two Thousand Species, interspersed with "readable matter," and above two hundred woodcuts, fifth edition, 2 vols, fcap. 8vo, cloth, 10s. John Van Voorst.

Brande's Dictionary of Science, Literature, and Art. Reconstructed by the Author and the Rev. G. W. Cox, M.A. 3 vols, 8vo, 63s. London: Longmans.

Ure's Dictionary of Arts, Manufactures, and Mines. Rewritten and enlarged by R. Hunt, F.R.S. With 2,000 woodcuts. 3 vols, £4 14s 6d. London: Longmans.

Holiday Excursions of a Naturalist., forming a Guide Book to the Natural History of the Inlands and Littorals. Crown 8vo, cloth, price 7s 6d. London; Robert Hardwicke, 192, Piccadilly.

Meetings of Learned Societies.

ROYAL HORTICULTURAL SOCIETY.

On Saturday, April 30, Dr. Masters continued his Lectures on "Plant Architecture;" the subject this day was "The Leaf and its Modifications." After alluding to the points of distinction between it and other organs, to its parts, and to the principal heads under which the exceeding numerous variations in its conformation might be grouped, the lecturer passed on to the consideration of the arrangement of the leaves on the stem and branches—a matter of more importance than the mere shape. The different ways in which the leaves emerge from or are attached to the stem and branches, were explained and illustrated. In all cases, whether the leaves are arranged in pairs, in whorls, or in spiral cycles, care seems to be taken that one leaf shall not interfere with the growth of its neighbours, so that in the case of two adjacent leaves, the one never completely overlaps the other, however crowded they may be, and in this manner every leaf has a fair chance of due exposure to light and air. The same end is sometimes attained by the development of a larger leaf at the base of a spiral cycle than elsewhere, so that the upper smaller leaves only partially overlap the larger one below. The lengthening of the stem between the leaves, and the consequent separation of these organs one from another, tends to the more free exposure of leaf surface; on the other hand where, as in the case of the House-leek, (*Sempervivum*), the stem is very short and contracted and the leaves numerous, the individual leaves are small and comparatively imperfectly developed. Here the number compensate for the diminished extent of surface in the case of separate leaves. The curious way in which the leaves are often bent so as to get out of one another's way, in cases where if they retained their original direction they must necessarily interfere with their neighbours, was also alluded to as offering another instance of the way in which the arrangement of these parts is subordinated to the offices they have to fulfil as the main organs of respiration, exhalation, and digestion, functions which demand free exposure to light and air for their due accomplishment. Where leaves have to perform the duties of protectors, as in the case of the scales of the leaf-bud, the outer portions of the flowers, &c., there is less need of a widely expanded surface, and the object is attained by the close approximation of a number of imperfect or rudimentary leaf-scales.

Saturday, April 27.—The last of the series of short lectures on "Plant Architecture" was given on this day, and was devoted to the consideration of "The Flower," the various parts of which were pointed out, some seeming to be useful for protection, or for attracting insects, while the stamins and pistils are exclusively devoted to the formation of the seed. The numerous forms which the flower assumes may partly be explained by reference to the principles upon which the leaves are arranged on the stem, as explained at a former lecture, the same principles holding good in the flower. If the parts of a flower are few and even in number, they are usually arranged in pairs, which cross one another or decussate as in the case of "opposite" leaves; the pairs of organs are in this case formed simultaneously, but if the number of parts in the flower be large, or if the number be *odd*, say 3 or 5, or some multiple of those numbers, then the arrangement is spiral, and the development successive. In both instances, as a rule, the organs are so placed as not to interfere with one another, and where, as in the case of Sabia, &c., the "law of alternation" is departed from and stamen stands before petal, petal before sepal, and so on, instead of one petal between two sepals, &c., it will be found that either there is great disproportion in the size of the organs, so that they scarcely impede one another at all, or else that the direction of the parts is different, one being erect, another reflected or bent out of the way, and so forth.

BOTANICAL SOCIETY OF EDINBURGH.

The Monthly Meeting of this Society was held on Thursday, 11th ult., Isaac Anderson-Henry, Esq., President, in the chair. The following communications were read:—1. "On Silicified Vegetable Structures from the Zambesi." By Dr. John Lowe, Lynn.—2. "On the Progress of Cinchona Cultivation in India." By an Indian Correspondent. Communicated by Professor Balfour.—3. "Notice of Cinchona Planting in the Kangra Valley." By William Coldstream, Esq., B.A.—4. "On New Zealand 'Carrageen.'" By W. Lauder Lindsay, M.D.—5. "On the Botany of the 'Jardin' of Mont Blanc." By Dr. Buchanan White.—In this communication the author gave an account of an excursion which he made to the "Jardin" on Mont Blanc, in September, 1866. He remarked:—"The height above the sea is between 9000 and 10,000 feet. A flock of ptarmigan seems to be the only feathered colonists of the place; while a few insects, including among others the common tortoiseshell butterfly (*Vanessa Urticæ*), one or two species of the genus Erebia, the larva of an Argynis, completed the zoological list. The flora has been several times investigated, and, among others, by Mr. Percy, who recorded the plants he found at a meeting of this Society. In a paper by Professor Martins in the Memoires for 1865 of the Academy of Sciences of Montpellier, the Phanerogamia he stated to be 87 in number; Musci, 16; Hepaticæ, 2; Lichens, 23—making a total of 128 plants. In my visit I found in flower 45 of the species given in Professor Martius's list, and 4 species not mentioned therein; one Fern, Allosorus crispus (not mentioned by him), and one species of Agaricus. The Mosses and Hepaticæ I have not yet examined, but of the former I have at least 26 species, and of the latter 3." The paper was illustrated by specimens of the plants collected, and photographs of the "Jardin."—6. "Notes on Grimmia subsquarrosa of Wilson's M.S." By Dr. Buchanan White.—7. "Note on the Occurrence of Buxbaumia indusiata in Aberdeenshire." By Professor Dickie.—8. "Extracts from Botanical Correspondence." By Mr. John Sadler.—9. "Report on the State of the Open-Air Vegetation in the Royal Botanic Garden." By Mr. M'Nab.—10. "Miscellaneous Communications." 1. Mr. Isaac Anderson Henry, Hay Lodge, exhibited a growing plant of Draba violacea, which he had raised from seeds transmitted to him by Dr. Jameson, of Quito. 2. Mr. R. M. Stark exhibited growing specimens of American plants in flower.

LINNEAN SOCIETY.

April 18.—G. Bentham, Esq., in the chair. Abbotts Smith, M.D.; and W. E. Williams, jun., Esq., were elected Fellows. The papers read were:—1. "On the prevalence of Entozoa in the Dog, with remarks on their relation to Public Health." By T. S. Cobbold, M.D.—2. "Fungi Angolenses: a description of the Fungi collected by Dr. Fredrich Welwitsch in Angola during the years 1855-61." By Dr. Welwitsch and F. Currey, Esq.

On Wednesday, May 1st, the President gave a Soirée at Burlington House. Mr. A. Wallace, F.Z.S., etc., exhibited a case containing fourteen specimens of an eastern butterfly (*Kallim anachis*). The singularity of this butterfly consists in its exact similitude to a dead leaf, when the wings are folded and the insect at rest. To illustrate this, the butterflies are fastened to a spray, and thus represent its foliage, and so close, even to the minutest detail, is the resemblance to leaves, that the keenest eye can scarcely detect the difference, or say they are not leaves he is looking at. Major Owen, F.L.S., exhibited some exquisite specimens of Pteropoda, skimmed from the surface of mid ocean. Examples were shown obtained from the Indian Ocean, and South and North Atlantic Oceans, which were taken with a net towed after the ship. The forms of some of these singular and delicately fragile creatures, were beautiful beyond all power of description. Major Owen also exhibited some new microscopic forms of *Thalassicolla*. Mr. Leadbeater, F.L.S., exhibited some very admirable examples of bird stuffing. Mr. W. Rich, of Great Russell-street, showed a remarkably fine specimen of *Echinocrinus*, from the carboniferous limestone obtained at Clevedon, near Bristol. Also a case of shells (*Fusus*), showing how singularly alterations of form may arise from change of *habitat*. Mr. Stevens showed some good specimens of *Euplectella;* and a case of curious crabs, from Malden Island, South Pacific, were exhibited by Mr. H. Deane. Arranged on the side wall was a fine series of illustrations, about forty-three in number, of Cretaceous echinidæ, Liassic reptilia, Liassic corals, Silurian brachiopoda, trilobites, and recent corals, exhibited by the Rev. Thomas Wiltshire, F.L.S. Mr. Bull, F.R.H.S., exhibited a great variety of new and rare plants. Amongst the orchids we may specify *Anthurium Schertzerianum* a brilliant scarlet flower, with a kind of crumpled horn growing from its upper edge; *Uropedium Zindenii*, a most grotesque flower, having three of the petals in each flower extended to eighteen inches in length, and drooping like slender pennants from a mast-head during a dead calm; *Cypripedium villosum*, and *Sarracenia Drumundi*, as being singularly rare, grotesque in form, and as unlike each other, as they are unlike every other kind of flower. A plant of *Aucuba Japonica* was exhibited, curious, inasmuch as it had fertile seeds. The female plant has been long common, but the male has only been obtained very recently. Mr. Saunders, V.P.L.S., exhibited a series of very rare and certainly very lovely plants. A begonia (sp. *nov.*) peculiar for growing its flowers up the main stem; a very splendid orchid (*Saccoladium ampellaceum*) remarkable for the bright pink colour of its flowers.

GEOLOGICAL SOCIETY.

April 17th.—Sir Charles Lyell, Bart., M.A., F.R.S., Vice-President, in the chair. The following communication was read:—"On the Physical Structure of North Devon, and on the Palæontological Value of the Devonian Fossils." By Robert Etheridge, Esq., F.R.S., F.G.S., Palæontologist to the Geological Survey of Great Britain. The Lower, Middle, and Upper groups of sandstones and shales of West Somerset and North Devon were described in this paper as occurring in a regular and unbroken succession from north to south, namely, from the sandstones comprising the promontory of the Foreland, at the base, to the grits and slates, etc., overlaying the Upper Old Red Sandstone of Pickwell Down to the South. The author was unable to see any traces of a fault of sufficient magnitude to invert the order of succession, or that would cause the rocks of the Foreland at Lynton to be upon the same horizon as those south of a line of high ground that passes across the county from Morte Bay on the west to Wiveliscombe on the east. The Foreland grits and sandstones are overlain by the Lower or Lynton slates, and form a group equal in time to the Lower Old Red Sandstone of other districts, but deposited under purely marine conditions. The author then showed that above the Lower or Lynton slates there is an extensively developed series of red, claret-coloured, and grey grits, from 1500 to 1800 feet thick; these form a natural and conformable base to the Middle Devonian or Ilfracombe group. The highest beds, containing *Myalina* and *Natica*, insensibly pass into the gritty and calcareous slates of Combe Martin, Ilfracombe, etc.; this Middle group Mr. Etheridge unhesitatingly regarded as the equivalent of the Torquay and Newton Bushel series of South Devon. The author compared the whole of the Devonian fauna of Britain with that of the Rhine, Belgium, and France, by means of a series of Tables based upon the British types. These marine Devonian species were compared with those of the Old Red Sandstone proper, the Silurian, and Carboniferous, and analyses were made of all the classes, orders, genera, and species, with relation to the groups of rocks in which they occur—the result being the conclusion that the marine Devonian series, as a whole, constitutes an important and definite system.

At the Meeting on May 8th, Sir William Logan read a paper on new specimens of eozoon discovered by him; these specimens were from explorations made by the Canadian Geological Survey, and afforded Mr. Dawson who followed with a paper on the fossils recently obtained from the Laurentian rocks of Canada and on objections to the organic nature of eozoon, conclusive evidence of their organic character, opinions shared by Dr. Carpenter who also had the opportunity afforded him of their investigation, and of testing their organic nature by the long and accurate attention he has paid to such organisms with the microscope.

ROYAL MICROSCOPIC SOCIETY.

On Wednesday, April 24th, the Soirée of the above society was held at King's College; more than a thousand guests attended. Between two and three hundred instruments were shown in the different rooms. Mr. Baines detailed some of his African adventures, which were illustrated by himself and projected upon a screen by one of Hou's oxy-hydrogen lanterns. The evening passed away very pleasantly.

On May 8th, a very interesting communication from J. B. Sheppard, Esq., M.R.C.S., of Canterbury, was read by the Rev. J. B. Reade, "On an example of the production of a colour possessing remarkable qualities by the action of monads (or some other microscopic organisms) or organized substances." Mr. Sheppard recently found on submerged stones, in a pool in East Kent, some olive-coloured confervoid filaments, resembling those of oscillatoria or diatoms. Being unprepared with bottles or other collecting apparatus, he wrapped some of these fibres in paper which was greasy with the fat of some sandwitches provided for refreshment. On arriving at home, he was astonished to find the paper stained red and purple by gelatinous globules looking like coagulated blood, and that on placing these globules in water, the liquid became of a red, Magenta colour when the light was reflected from it, and of a lambent blue when viewed by transmitted light. He made a variety of experiments to ascertain whence the colour was derived. From an offensive odour arising from it (so powerful as to occasion headache and sickness), he was, at first, disposed to attribute it to decaying vegetable matter, but he at last satisfied himself that it was caused by the action of some form of animal life, such as vibrios or monads, on some form of soluble albumen. It was not attributable to the vibrios themselves, for they were colourless. The colouring matter can be separated from the animals which produce it; and it appears to be identical in its properties with the aniline colour known as "Magenta." Not the least remarkable circumstance connected with this solution is the spectrum it exhibits when submitted to the analysis of the micro-spectroscope. Mr. Browning pronounces it to be the most curious he has ever seen. A strong, dark band appears between the red and orange, with a trace, also, of the characteristic band of the blood spectrum. Several important subjects for future thought and investigation are evidently involved in this singular discovery.

ETHNOLOGICAL SOCIETY.

At the meeting held of this Society, Mr. Crawfurd, president, in the chair, a short and interesting paper was read by Dr. Collingwood on "Some Natives dwelling in the North-eastern end of the Island of Formosa." In the walled village called Kibalon, in the Sano Harbour, he had an opportunity of comparing these natives with some Chinese who occupied another portion of the bay, who had come from Amoy, and the contrast was greatly in favour of the Formosans; they were a fine, tall, musical race, open and frank in bearing, and their children and young people merry, full of fun and enjoyment. On ordinary occasions these people go perfectly naked, but in the presence of visitors they adopt the Chinese drawers, and the women, who are exceedingly fine and handsome in appearance, assume an appropriate garment; their engaging manners, free from awkwardness and the restraint imposed on women so universally in China, their flushed cheeks and love for finery were most noticeable; they possess also a higher natural refinement than the Celestials. There was still another race of natives in the interior, a wild and lawless set, of which the dwellers in the village had the greatest fear, and it was with difficulty one could be induced to serve as guide to the explorers.

The Chairman read his paper on "The Skin, the Hair, and the Eyes as Tests of the Races of Men." He proceeded to survey the conditions of man geographically distributed, and after a clear and rapid survey of the whole human race in respect to the subject of his paper, he concluded by stating as to the question of variety of colour in the skin in the races of man, its apportionment is evidently a mystery beyond our reach, just as much as are the variety and distribution of colours in the different species of the same genera of the lower animals. Some have fancied that colour in man depends on climate, or that a powerful sun makes the complexion more or less black, while a weaker one leaves it to improve in fairness in proportion to its feebleness. This popular error arose out of the narrow experience of our ancestors. It is a fact that the races of Southern Europe are generally of darker complexion than those of the north. Dark complexions diminish until we reach the people of Scandinavia, when the fair skin attains its acmé. After this, however, it becomes darker as we leave the sun, up to the polar circle.

Mr. Dunne stated his views had undergone no change since he read his paper some nine years ago on the subject, and read a portion of it.

Mr. Carter Blake spoke of the discoveries of M. Pruner Bey as tending to divide all the human family into three classes; the transverse section of whose hair fell into the category of circular tubes of the great European race, the elliptic tubed hair of the American, the Mongolian, &c., the ovoid contour of the true negro. He congratulated the Chairman on the important bearing of his paper, in which he clearly overthrew the old idea that climate influenced colour.

Mr. Mackay said the hair of the negro was reniform, and hence its spiral form; he appeared to think that light was the main influence in affecting the colour of the skin.

A paper by Dr. Cullen on "The Darian Indians, their Habits and Customs, and their Longevity, their Domestic Occupations, and the Natural Productions of the Country," was read.

Mr. Jon A. Hjaltelin read a paper on the "Civilisation of the first Icelandic Colonists, with a General View of their Manners and Customs." The author told of the coming to the island in the 4th century of a band of Irish missionaries whose remains were found in later times by a host of Norwegian exiles who, from political causes, were either obliged to leave Norway, or sought for the freedom denied them in their own country in this distant region. Of these early colonists there are abundant records, both in Irish and Norwegian ancient literature. Celtic remains are accurately described in the early manuscripts. These people had even in remote times attained to a degree of civilisation hardly to be realised without study of their writings.

The Hon. A. Dillon, who had visited the island, gave his opinion of its present condition, and having devoted much attention to the Icelandic literature, spoke favourably of their early attainments in laws, astronomy, and navigation.

Mr. Crawfurd stated that Iceland is one of the few localities destitute of aborigines, and while he doubted the Irish colony, he had equal misgivings of the value of the contents of the Sagas and Eddas, so much spoken of by literary people.

Dr. Lamprey read further remarks on the "Chinese Ethnology, and Notes on the Comparative Ethnology of the Chinese Race."

Dr. Lamprey exhibited the skulls of Chinese, and Hottentots from South Africa, with illustrations of these latter people by Mr. Baines, the African traveller.

ZOOLOGICAL SOCIETY.

May 9. G. Busk, Esq., in the chair. Mr. P. L. Sclater made some remarks on recent additions to the society's menagerie, amongst which were particularly noticed a pair of Kaka parrots (*Nestor hypopolius*), presented to the society by the Acclimatization Society of Canterbury, New Zealand; Mr. Sclater also exhibited a skull of Baird's tapir (*Tapirus Bairdi*), from Nicaragua, which had been forwarded to him by Capt. J. M. Dow. Prof. Owen communicated a letter addressed to him by Sir W. Elliot, containing a correction of an error made in Prof. Owen's recent memoir "On Indian Cetacea collected by Sir W. Elliot.' A communication was read from Mr. G. Krefft, containing a description of the same bird of which a specimen had recently been received by the Sydney Museum. Prof. Owen communicated some notes, by Mr. E. S. Hill, on the mode of passage of the young kangaroo to the pouch at the time of birth. A communication was read, from Dr. Macalister, on some points in the anatomy of a cetacean *(Globiocephalus)*, lately captured off the coast of Ireland. A communication was read, from Dr. F. Day, containing descriptions of ten new or imperfectly known fishes of the Madras Presidency. Dr. Baird and Mr. H. Adams communicated some notes upon some interesting Chinese shells, together with descriptions of some new species of Unionidæ, collected at Shanghai by Dr. J. Lamprey. A paper was read, by Dr. J. E. Gray, containing notes on the arrangement of sponges, with the descriptions of some new genera of this order. Dr. Murie read a memoir on the dermal and visceral structures of the kagu, sunbittern, and boatbill, as observed in examples of these birds recently deceased in the society's menagerie. A communication was read from Dr. A. L. Adams, containing a description of a new fossil dormouse from the quaternary formations of Malta, proposed to be called *Myoxus Melitensis.* Mr. E. Blyth exhibited a skin of a quail, shot near Mussouree, new to the Fauna of Continental India, but already described by Dr. Gray, under the name *Rollulus superciliosus.*

ROYAL GEOGRAPHICAL SOCIETY.

At a meeting of this society on the 13th inst., Sir R. I. Murchison, who presided, said he was happy to inform the meeting that at the solicitation of the society the Government had, with great liberality, granted a certain sum of money towards an expedition in search of the only fact which it was desirable to set at rest, whether Dr. Livingstone had been killed at the spot described by the Johanna men, about thirty miles from the northern end of Lake Nyassa. To send an expedition into the interior of the country would be a search in vain, because Livingstone, if he once succeeded in getting through the difficulty which he met with in the first instance, would be in comparative safety, and would be on his way to the lake Tangyanika, which was the great object of his journey, with the view to determine whether that lake had a northern outflow, and whether it might not be one of the ultimate sources of the Nile. The expedition would be under the command of Mr. Allen Young, who for two years served under Livingstone, in charge of the Pioneer on the Zambesi. The Admiralty were building a steel boat capable of being taken to pieces and carried up the rapids of the river Shire by the three men who would accompany Mr. Young; and thence they would advance to the north end of Lake Nyassa, where they would ascertain completely whether the story of Livingstone's death was a fable or the truth. With regard to the possibility of his being in the interior, a caravan of Arab traders, a month or two after his reported death, left a spot within ten miles of where Livingstone was said to have been killed, and upon their arrival at Zanzibar they declared that they had heard nothing of the event; on the contrary, that he had passed on into a friendly country. He had also received only that morning a letter from Dr. Kirk, reporting that a trader had recently arrived, coming direct from Lake Tangyanika, who averred that he had seen and spoken with a white man. Dr. Kirk said he had not then found this merchant, he had only heard the report of what he had said. Now, if this report were true, what white man could it be but Livingstone? for no other European, he could affirm, had gone into those regions of late years. The report, so far, was consolatory, and it was a justification of the propriety of the search which the society had set on foot.

Captain Sherard Osborn exhibited a diagram from surveys made by the Russians in Eastern Siberia, and from maps of the caravan routes in Central Asia by Colonel Walker, of the Hindostan survey, and by means of these and such geographical information as he could gather from Du Halde and others, he was enabled to explain in a clear and intelligible manner the present actual condition of the Russian possessions now nearly advanced to our own frontiers of Western British India.

Mr. Ley, Commissioner of Customs formerly, gave a sketch of the progress of the Russians in Northern and Central Asia since the year 1640. Sir H. Rawlinson commended the paper as a *résumé* of the information we possess regarding Central Asia, put in a popular point of view.

Correspondence.

Under this head we shall be glad to insert any letters of general interest.]

BIRDS OF PASSAGE.

SIR,—The remarks of "B," in the *Naturalist's Note Book*, page 23, quoted from *Land and Water*, relative to the passage of migratory birds, are curious in the extreme. "B" is of opinion that birds of passage leave by night, and the reasons he assigns for this, drawn from certain observations alleged to have been made by him, are scarcely less remarkable. His theory seems almost as wild as that of the naturalist who fancied that swallows become fish during the winter months, and live in the water. I think that a far more reasonable and feasible theory is, to believe that the passage of migratory birds from one country to another is directed by a simpler and more natural cause. My own opinion is that they follow the insects upon which they evidently live, and that as the great horde of insects change their position according to the temperature of the atmosphere—the same temperature (or nearly the same), being always essential to their existence—so the ordinary birds of passage change theirs in pursuit of their prey.

The naturalist can scarcely have failed to observe, during the summer months, that the altitude at which the martin and the swallow flies, is solely referable to atmospheric causes.

When clouds obscure the sun, and the air is humid, and the temperature is low, it may always be observed that these birds, so to speak, "hug the earth," that is to say, they invariably fly at the lowest altitude. On the contrary, when the temperature is raised, and the sky is clear and dry, they frequently soar so high that they are scarcely visible to the naked eye. The reason for this changing position may safely, I think, be said to be the same as that to which I have before alluded. The insects upon which these birds habitually feed are influenced entirely by atmospheric changes, and undoubtedly much the same temperature is essential to their existence.

It would hardly seem wise in these days of science and common sense, to suppose that the myriads of tiny insects that fill the air during the summer months, all perish at the approach of winter. Is it not far more reasonable to believe that they change their position horizontally as well as perpendicularly, with the change of the seasons, and that they also are migratory? At least I know of no better theory than this, but I should not be averse to learn if a better one really does obtain,

I am, Sir, yours faithfully,
ALFRED LEIGH HUNT.

THE EARTH'S ORBIT AND OUR SEASONS.

SIR,—The following considerations will, I think, satisfy your correspondent H. H. Ulidia, that the writer in the *Scientific Review* was correct in his assertion that "the elliptical form of the earth's orbit produces in reality no effect on the seasons."

As your correspondent observes, the sun is about eight days longer in the northern hemisphere than in the southern. The northern spring and summer are, therefore, longer than the southern.

But the sun passes his aphelion, or is at his greatest distance from the earth on the 1st of July, that is during the northern summer.

Thus, although the northern spring and summer are longer than the southern, they are at the same time, somewhat colder, owing to the sun's greater distance, and these two effects exactly counterbalance each other,

I am, Sir, yours truly,
GULIELMUS.

POULTRY.

SIR,—"Who would keep poultry?" are the words of not a few persons who are either ignorant of poultry matters, or have some different fancy which runs counter to a love of fowls as domestic favourites. Such a sentiment indeed cannot be entertained by an intelligent amateur, or experienced farmer. It is generally supposed that poultry, if allowed the run of fields where corn is planted, will rake up and devour it. This, in my opinion, is a great mistake, for it has been proved by much experience, that fowls, both by destroying noxious insects, and enriching the soil with their dung, do much more good than harm; if the seed corn be well ploughed into the ground, the fowls will not take the trouble to root it up, since they can obtain insects, which they greatly prefer, with much less difficulty. When the corn begins to appear above ground they certainly destroy a little at first, but they soon tire of it, and leave it for grass which is much more tender.

Fowls require animal food, and will not thrive without it, and in summer it is a great save of expense to let them find it for themselves. The exercise also is very good for them, and it is well known that fowls confined in yards lay very few eggs compared with those that have free access to the fields. Fowls kept either on a large or small scale, if managed properly, are both interesting and profitable. Some people indeed, make nothing by them, and just because they deserve nothing better. Laziness or greed, is in such cases generally visible; one of these unlucky beings packs a pretty large stock into a small hole, where every passer-by is offensively met by the strong fumes rising from the accumulated droppings of the unhealthy inmates. Another feeds them on boiled potatoes tainted with disease, or with any other unwholesome food that comes to hand, thinking "any slobber is good enough for hens." To advise such persons to give up keeping poultry, would be an act of humanity, for no one I think could wish success to persons so cruel and greedy. There is at present a great demand for the Cochin, Brahma, Pootra, and other foreign fowls, but having had great experience both in these and our best British fowl, the Dorking, I greatly prefer the latter, it being an excellent layer, a good sitter, and the finest fowl for the table. In conclusion, I would advise all country gentlemen to keep at least a few fowls of *one kind;* to see that their houses are not over-crowded, well ventilated, and cleaned daily, to change their food occasionally, and never withhold sound grain as a portion of their daily fare. They will find this a source of great amusement, and very little trouble.

I am, yours truly,
J. D. S. W.

Short Notes.

GINSENG.—The Foreign Commissioner at the treaty port of Newchwang reports that ginseng maintains its great repute in China. Every native from the Emperor to the humblest coolie, places implicit faith in the efficacy of this strange root, which for ages has been extolled as a universal medicine or panacea. The genuine Manchurian ginseng consists of a stem from which the leaves spring, of a centre root, and of two roots branching off at the same point from each side of the centre root; the stem somewhat resembles the head and neck, the side roots the shoulders and arms of a man, the main root represents the body, and a fork which the main root frequently forms supplies the legs. The Chinese, with a not ungraceful feeling, believe that a plant which thus expands into the human form, amid thickets and jungles on which the foot of man never trod, must be intended to alleviate the sufferings of the human race. For ginseng loves the moist dense forests which cling to the slopes of the hills; it nestles in recesses which are as pathless now as in the days when the Golden Tartars were dwelling in the plain. Fine Manchurian ginseng is only found in the upper valley of the Usuri, where ruined towns and forts mark the cradle of the race which occupies the Imperial throne. The precious qualities of ginseng are increased and intensified by age, and a plant is of no great value until it has been growing and gathering strength for at least an ordinary lifetime. The upper portions of the root possess the healing power; the stem which appears above ground ought not to be eaten. Formerly the collection of ginseng was in the hands of some 40 merchants, who obtained the necessary authority from the Tartar General of Kirin on payment of a heavy fee, handing over to Government also a certain weight of the product of the search. The merchants employed outlaws, whom the fear of punishment had driven to take refuge in these wilds, and who underwent great hardships in the task, menaced by starvation, and by the wolf, the tiger, and the leopard. But in the time of Taukuang ginseng was becoming yearly more scarce, and plants of any great age were rarely found. In order to arrest their utter extinction, the collection of the wild root was prohibited by Imperial edict. Nevertheless a very small quantity is still clandestinely collected—to a considerable extent, however, in Russian territory. The cultivation of ginseng, though allowed, is not encouraged. It is cultivated in Manchooria, and in the Corea.

THE BETEL NUT.—The trade in this curious article of consumption is of vast extent throughout the Eastern seas, and the ports of Sumatra, Cochin China, and some other localities, are annually visited by the merchant fleets for its collection. The sea-board of the Acheen country, which is under the government of the Rajah of Acheen, is perhaps the most important trading point, and is pretty generally spoken of as the "Betel-nut Coast;" and the inhabitants of many towns and villages of considerable local importance trade in betel-nut exclusively, not only furnishing cargoes to ships, from the continent of India, but indirectly supplying the Chinese markets (where these nuts are valued at from three to four dollars the pecul, according to quality), through Penang, whither the cargoes are first sent. The export from one of these Acheenese towns amounts to about sixty thousand peculs annually; the total supply collected from the various ports of shipment on the whole line of the Betel-nut Coast is estimated at ninety thousand peculs per season, commencing in May and ending in August.

The nut is the produce of the Areka palm (*Areka Catechu*), which is one of the most beautiful members of the palm family, shooting its slender stem straight up to the height of from fifty to sixty feet, when a splendid mass of dark green leaves is thrown out like a huge plume of feathers. These palms produce their nuts but once during the year, at which time they present the most beautiful and attractive appearance that can well be imagined; the fruit hangs in clusters at the ends of the long, tough stems from which it is suspended. It is of an elongated oval form, about the size of an egg, and of orange colour, contrasting charmingly with the rich green of the palm leaves. Each nut is enveloped in a thick fibrous coat; on removing which the kernel is found within, covered with a much slighter and more delicate integument, each husk containing one nut only. These, when removed from their coverings, are usually of an irregular conical form.—*Nature and Art*, May.

A CURIOUS RAT.—By the kindness of Mr. Taylor, the civil and intelligent official at the Waterloo Railway Station, I have received the most remarkable rat it was ever my luck to behold. The poor thing has a bone collar round its neck; this collar is evidently a section of pig's thigh-bone. It is a little larger than a gentleman's full-sized finger-ring, but a little broader. The only way I can account for the ring being on the rat's neck—unless it was put there by human hands—is that when he was young he has been stealing and gnawing at a rasher of ham. During his work he has, unfortunately for himself, thrust his head through the ring-shaped bone, the set of his ears and the size of his head not allowing him to pull it off again. As the rat grew larger (he is now about half-grown) of course the bone got tighter, and now his neck is considerably diminished and elegantly fashionable. The neck, I observed, was in a considerable state of inflammation; but as the rat ran about his open wire cage, I poured warm water on it with a large sponge. The poor little animal stood still, raising himself on his hind legs, and seemed to much enjoy the ease the fomentation evidently afforded. Having fomented him a while, I caught him, and, placing him in a cloth, operated with a sharp lancet on a swelling under his jaw, caused by the pressure of the ring. The poor thing was very much relieved by what I had done for him, and the ring seems certainly looser. By judicious treatment I hope to keep this rat alive with the collar round its neck, and make a "perfect cure" of him. It will be curious to see how far Nature will adapt herself to this most singular accident.—FRANK BUCKLAND.—*Land and Water*, May 11.

NOTES ON RARE BIRDS.—A gentleman writing to *Land and Water*, May 11th, says Black Kite (*Milvus migrans*, Linn.) A very fine full-grown male of the black kite was taken in a trap by Mr. Foulger, the Duke of Northumberland's head gamekeeper, at Alnwick, in May, 1866. The plumage was in good condition, except on the lower part of the body, where it had been injured by the trap. This is, probably, the first occurrence of this bird in Britain. —The Waxwing (*Bombycilla garrula*, Linn.).—This bird has appeared in considerable numbers in the northern counties of England this winter. In the last weeks of November several specimens were shot in the neighbourhood of Rothbury and Stanhope. Again, in the early part of December, Mr. Embleton shot six in the neighbourhood of Broomhouse, in Northumberland. About the same time seven was shot at Berwick, three at Norton Cross near Darlington, sixteen at Stanhope, and eight at Alnwick. Ten are reported as having been shot on the Tyne, a few miles above Newcastle, in the latter half of December. The death of others is reported in January. Altogether eighty-two specimens are known to have been killed in Durham and Northumberland.

ZANZIBAR.—Zanzibar is the chief market of the world for the supply of ivory, gum, copal, and cloves. The export in the single year was 488,600lbs. of ivory, worth nearly £147,000, gum is dug from the earth in places where no trees are found, and is supposed to be in inexhaustible quantity, but from the indolence of the African negro only about £37,000 worth was sold in a year, while the cloves produced nearly £56,000. These clove trees of Zanzibar have been only introduced about thirty years, having come from the Mauritius, (a fact well worthy the notice of our Acclimatisation Society). Cowries worth £52,000 were sent to Africa with sesamum, red pepper, cocoanuts, cocoa-nut oil. Sesamum is also of very recent cultivation, and arose out of a demand for this production for the French market in 1859: the receipts for it exceeded £20,000. The value of the trade for the year altogether, was £1,664,577; and in 1834 the government report of the commander of the Imogene stated that "the trade of Zanzibar is very trifling," a few cloves, a little gum and ivory being all that the place produced.

MITES IN POTATOES.—The unusually wet weather experienced in France last year was found to produce a very serious effect upon potatoes. Myriads of mites, of the species described by zoologists as the *Tyroglyphus feculæ*, covered them in a few days, presenting the appearance of an animated gray dust. This dust, which could be collected in large quantities by means of a feather, consisted of the insects in every period of their existence. As might be expected, it attracted great numbers of other insects, who thus obtained an abundant feast, but presented a very strange appearance, becoming coated all over with the dust, so as to be no longer recognisable. Even those potatoes which were apparently sound were covered with the mites, and the very pavement on which they are laid became in a short time overspread with them to a very considerable thickness. It is not yet known whether they are the cause or the consequence of the potatoe disease, which at a later period makes its appearance.—*Scientific Review*, April.

RING OUZEL.—The ring ouzel has been known occasionally to nest in this county, and although probably overlooked, from its general resemblance to the common blackbird and the similarity in the eggs of the two species, it is not improbable that a few pairs may do so nearly every year in favourable districts, and I have reason to believe that such is the case at Holkham. Mr. Spalding, of Westleton, who has paid much attention to their habits in Suffolk, assures me that he has himself taken several nests and eggs in his neighbourhood, where they remain till late in May, should the winds be contrary, and then frequently nest and lay; but he has never known the young to be hatched, as the old birds appear at once with the first favourable wind for more northern localities. They build on the stubs in low damp cars, both at Westleton and Yoxford, where the birds have been watched, and would appear to remain in all cases at no great distance from the coast. About thirty years ago a nest of this species, with the old bird sitting upon it, was found by Mr. Rising in his garden at Horsey."—*Stevenson's Birds of Norfolk.*

A CLEVER PONY.—Sir Emerson Tennent gives in *Land and Water* an interesting account of a pony, the property of Mr. Field, of 47, Warwick-street, milkman, which brings milk to Sir Emerson's door daily. The little animal was bought cheap by Mr. Field some five years since, on account of the evil character which it bore as a jibber. By means of bread, sugar, and chestnuts it has been tamed, and it now moves from door to door of its own accord, preceding the milkman in charge of it; so that whilst he is settling with the servants at one house, the servants of the next house, warned by the sound of the stoppage of the cart, may be in readiness to take in the milk when the man arrives. More than this. At certain doors, where the pony is in the habit of being regaled with doucers of bread, apples, &c., the sagacious little animal contrives, without upsetting the cart, to raise the knocker with its nose and rap twice.

ST. HELENA SEEDFINCH NEAR LONDON.—A very perfect specimen of this beautiful finch, the Cythragra butyracea of scientific authors, was brought to Mr. Ashmead's, of Bishopsgate-street, last week, for preservation; it was observed consorting with greenfinches several weeks previously, and was taken alive and caged; it soon grew tame, and evinced a very familiar disposition. Examples of this interesting bird have frequently been in our aviary at the Zoological Gardens, and one year a pair of them bred. It is not only valuable as an ornamental cage bird, its colour being a most vivid yellow-green, but has very engaging manners, and a sweet song. There is no reasonable doubt that in this instance the bird had escaped from confinement, but from its very perfect condition had evidently been long at liberty, and felt itself quite at home with its cousins, the greenfinches.—EDWARD NEWMAN.—*Field*, May 11.

PIED SPARROW.—A correspondent of the *Field* in a recent number says: We have a very curious specimen of a house-sparrow with us (a hen bird). Last year the head and beak of the bird were perfectly white after moulting; in the autumn the neck, back, and wings, including flight feathers, also became white, with the exception of three or four feathers of the ordinary colour, which gives the little bird a spangled and very pretty appearance. No doubt after the next moulting season it will be a perfect little snowball; the breast and tail feathers now only remain their natural colour. It is constantly about our station, and last brought up a brood of young in the goods warehouse; it is now preparing for a second offspring in one of the water pipes outside the same building. It is very tame, is a great pet, and feeds with my poultry daily.

CAMELLIAS AS CLIMBERS.—The following interesting note appeared in the *Field*, May 4th: Will you permit me to say a word in favour of camellias as climbers? If you have climbers you probably have a shady wall where few things will grow. I have a small vinery, and at the back wall I train up a trellice, camellias. They grow luxuriantly, and produce many hundreds of bloom annually. The border is 18in. wide and about 12in. deep, confined by slates and border tiles. Their peculiar advantage is that they require little sun. Secondly, they require so little water when once the buds are set. They do not materially interfere with the preservation of the grapes. I have a couple of bunches of Lady Down's seedling now hanging in the house, in which my camellias have freely bloomed, and surely no flower is more worthy of a place.

A CURIOUS FISH.—The *Courrier de Saigon* brings, as a contribution to Natural History, the not very credible-sounding description of a fish called "Ca-oug" in the Anamite tongue, which is said to have saved the lives already of several Anamites; for which reason the King of Anam has invested it with the name of "Nam hai dui bnong gnan" (Great General of the South Sea). This fish is said to swim round ships near the coast, and, when it sees a man in the water, to seize him with his mouth and to carry him ashore. A skeleton of this singular inhabitant of the deep is to be seen at Wung-tau, near Cape St. James. It is reported to be 35 feet in length, to have tusks "almost like an elephant," very large eyes, a black and smooth skin, a tail like a lobster, and two "wings" on its back.

THE GOLDEN ORIOLE.—On the 6th inst., when driving through some marshes near the S.E. coast of Kent, I met with a single oriole in full plumage, which kept before me for about a quarter of a mile, flying from tree to tree, where the hawthorns are rather thick and numerous. The day was unusually hot and bright, and the reflection on his yellow plumage made him (what he really is) comparatively a rare sight in this country. I hear or see one or two, nearly every year, of immature plumage, but the date of the above-mentioned bird is, I think, very early. I have never heard them before the end of this month. The bird I have recorded in this instance I am sure had not long arrived, as he was by no means shy, which is contrary to their general habit.—W. B. D.—*Field*, May 11.

TOMTITS NESTING IN A PUMP.—A pair of tomtits (parus cœruleus) have nested in an unused pump, three yards from the window of a room with numbers of people in it. The birds fly in and out of the slit in which the handle works, and the nest is about twenty inches from the top of the piston rod. The most curious and interesting part is that this is the fifth year in which these birds have built, or rather added to their nest, and hatched from six to eight eggs every year, in the most undisturbed appearance of perfect security, though a path to the garden passes the pump. Can they be the same pair of birds, or their "heirs, executors, and assigns," who have occupied the entailed estate from year to year? I confess this puzzles me, and I should like an explanation on the subject.—*Unus*, *Field*, May 18.

FISH CULTURE.—The *Mémorial de la Loire* says:—"In the Lake of Bouchet, belonging to the department of the Haute-Loire, an establishment of pisciculture has been founded, with the double object of turning the waters to account and of introducing into the rivers connected with it certain valuable kinds of foreign fish whose growth is very rapid. The operations, which commenced this winter, have perfectly succeeded, the hatching is terminated, and the small fry have already attained a size which allows them to be successively set loose in the water. Last week 10,000 young fish were put into the lake, consisting of salmon of the Rhine, graylings, trout of St. Front, others of the common sort, &c."

MARS.—Not a few astronomers have taken advantage of the recent opposition of Mars for study of some of the interesting phenomena of that planet. The ruddy colour has been ascribed to a peculiar absorption prevailing in its atmosphere; but Mr. Huggins, after careful examination with his spectroscope, is of opinion that the colour is produced by the material of which certain parts of the surface of Mars are composed. He finds, too, that Mars and the Moon have much in common as regards surface, and that the former absorbs a large proportion of the light which falls upon it.—*Athenæum*, May 18.

YELLOWHAMMER.—"As a cage-bird the yellowhammer, though looking a giant amongst the smaller finches, is exceedingly gentle in manner, maintaining his own rights with a quiet dignity that brooks no insult, though he never interferes with others. In fact, a feathered gentleman, and graceful in action, he floats, rather than flies, from one perch to another, or amuses himself by repeatedly springing into the air, and with a rapid turn of the wings alighting again on the same spot."—*Stevenson's Birds of Norfolk.*

Remarks, Queries, &c.

(*Under this head we shall be happy to insert original Remarks, Queries, &c.*)

ENTOMOLOGICAL NOTES FOR JUNE.—I have strung together the following notes, thinking they may be of use to those of your readers who have only recently commenced this interesting study. Amongst COLEOPTERA we have (during the month of June):—*Necrophorus Humator.*—This is one of the species of burying-beetles, so named from their habit of entering small animals after death as a receptacle for their eggs. Having found a mole, or mouse, or any other animal dead, they creep beneath the body and scratch away the earth until they have made a pit, into which the animal sinks; when of sufficient depth, the earth is thrown over it, and the young larvæ when hatched find themselves in the midst of food. This species is brownish-black; the three last joints of the antennæ orange-yellow, the elytra are deeply punctured, and each has three slightly elevated lines; the breast and legs are covered with yellowish hairs. *Geotrupes stercorarius* is entirely black above, tinted with violet; the thorax is without punctures on the disc, but has a few at the sides, and a short line in the middle; the elytra are marked with deep grooves, the spaces between being smooth and convex; the under side and legs are steel-blue, glossed with purple or green. *Lucanus Cervus*, called the stag-beetle, is about two inches in length, is entirely of a brownish-black colour, shining surface covered with small punctures, near the fore-leg a patch of golden-coloured hair; the female is smaller than the male. The formidable mandibles of this beetle are employed in wounding the bark of trees in order to feed on the sap. *Cetonia aurata.*—This, the rosechafer, is one of the most beautiful of British beetles; colour a golden green, very shining above, and a bright coppery hue beneath, elytra ornamented near the tips with transverse white marks, form of body rather obtuse. *Rhynchites populi.*—The body golden, green, or bluish tint on the upper side, and dark violet beneath; antennæ black, elytra punctured. *R. pubescens*, somewhat longer than the preceding, of deep violet colour, clothed with long hairs, elytra marked with punctured lines. *R. Bacchus* is a beautiful species, found chiefly in Kent on the vine. *Necrodes littoralis*, entirely black, three termal joints of the antennæ, yellow, three elevated lines on each elytron; spaces between thickly punctured; hind legs thick and toothed on the under side; it is found on the sea-shore and banks of rivers. *Dermestes lardarius*, a dirty ash-colour, with three small black spots; it infests bacon. DERMAPTERA.—*Forficula auricularia*, or earwig, is too well known to need description. TRICHOPTERA.—*Phryganea grandis*, upper wings brownish grey, with longitudinal black ray, and two or three white joints at the extremity; these are found near water, and are known as Caddice Flies or water-moths, and the larvæ Caddice worms, in which state they reside in the water, in cases made of sand, shells, &c. LEPIDOPTERA.—Under this head I fear I cannot do more than give the names, as a full description would take up too much of your space. *Hipparchia Galathea* (Marbled White); *H. Tithonus* (Large Heath); *H. Pamphilus* (Small Heath); *H. Janira* (Meadow Brown); *H. Hero* (Silver Ringlet); *Melitæa cinxia* (Glanville Fritillary); *Argynnis Adippe* (High Brown Fritillary); *A. Aglaia* (Dark Green Fritillary); *Vanessa urticæ* (Small Tortoise-shell); *V. Calbum* (Comma Butterfly); *Polyommatus agrestis* (Brown Argus); *Pieris cratægi* (Black-veined White or Hawthorne Butterfly); *Smerinthus ocellatus* (Eyed Hawk Moth); *Deilephila euphorbiæ* (Spotted Elephant Hawk Moth); *Macroglossa stellatarum* (Humming-bird Hawk Moth); *Lasiocampa quercus* (Oak Egger Moth); *Hyperacampa dominula* (Scarlet Tiger Moth); *Cerura vinula* (Puss Moth); *Thyatira Batis* (Peach Blossom Moth); *Melanippe hastata* (Mottled Beauty); *Ourapteryx sambucaria* (Swallow-tail Moth); *Hylophila prasinana* (Green Silver Lines); *H. quercana* (Scarce Silver Lines); *Abraxus grossulariata* (Gooseberry Moth). HOMOPTERA.—*Cicada spumaria*, is of a brown colour; with two white spots on the upper wings; the larvæ of this insect discharges a kind of frothy matter called cuckoo spit. DIPTERA.—*Œstrus equi*; head, yellowish white; thorax yellow, with elevated hairs on a bluish point; end of body reddish, with two black spots; the wings have a band in the middle, and two small black points at the extremity. These insects have the appearance of large flies; their habits are remarkable, each species being confined to its own quadruped, the horse, ass, ox, etc.: the larvæ reside either in the stomach or beneath the skin of cattle; the œstris of the sheep is small, and of a greyish colour; it places its eggs in the nostrils of that animal, whence the larvæ ascends into the head, and, when full-grown, falls and assumes the pupa state on the ground. *Tabanus bovinus:* head, greyish white; eyes, of shining green; thorax and body blackish brown, with spots of a red tinge; wings transparent, and veined with brown. *Musca domestica* (common fly); *M. Vomitoria* (Bluebottle Fly); *M. carnaria* (Blow Fly). The *Chironomus plumosus*, or Midge, finishes the list of insects and moths that may be looked for. This list may not be quite perfect, but will be useful to the young beginner.

E. G. S.

BEES.—A lover of flowers sends us the following in answer to A. B.—Your correspondent will find full, exact, and all possible information on bees in "My Bee Book," written some few years since, by the Rev. W. C. Cotton, son of the late excellent governor of the Bank of England. Mr. Wood, also, has published a little work, on their "habits, management, and treatment;" but all those who desire to read a very interesting and well-written, as well as amusing volume, should decidedly either get or borrow "My Bee-Book,"—and if they cannot afford this, "A Letter to Cottagers, the first on Bee-Keeping, and second on Bee-Observing," by the same author. Mr. Cotton, like all those who study and observe closely the habits of animals, made his bees quite his friends; and I well remember an account of his going down to Sydenham with some bees in his pocket, much to the astonishment of his host. In answer to A. B.'s query as to fumigating, &c., I will make an extract or two, from the work itself. Mr. Cotton advises all people, cottagers especially, to keep bees, well observing that it is economy to do so, and that many a good example of patience and industry do they afford, as well as employment of time. This "book" contains a voluminous list of treatises on bees, Huber's writing, and observations upon them, Sypendorf's, &c., and, above all, he deduces from their habits the one great object of the study of all works of Nature, and which everyone should keep in view, that of "looking thro' Nature, up to Nature's God," dedicating the work to his father, who, he says, "first gave me a love for bees, and made me an observer of the wondrous works of our heavenly Father." The following is a short extract from the book :—"In the first place, then, *never kill your bees.* Many will say, my father did so, why should not we? This is a very good rule, generally; but I hope to show you that the new path is better, and straighter, too, and the plan of learning is very well for those who know no better; but, I am sure, you must all feel sorrow when you murder those in the autumn who have worked hard for you all the summer, and are ready to do so again. In taking a hive, first, then, get everything ready beforehand, and sit up all night when ready. You will find in damp meadows a fungus, which is commonly called "puff-ball," the proper name being "Fungus Maximus," or larger mushroom, or "Fungus Pulverulentis." When quite ripe, a dirty powder, like smoke, comes out (this powder will stop bleeding). Pick them, when half ripe, put them in a bag, and when you have squeezed them to half the size, dry them in an oven, after the bread is drawn, and if fit for use, and properly done, they will hold fire, like tinder. When the fungus cannot be had, rag soaked in nitre will do; but this costs money. Second, mark your hives, having, I presume, weighed them when empty; get a little tin-box fitted to the nose of your bellows, having a spout coming from it, which fits the door of your beehive. (The stocks should, if possible, stand next to good, heavy ones, to which you may join the bees by this process.) Take a piece of fungus, twice the size of an egg, light it, and when it burns freely, put it into the box, fit it into your bellows, and blow the smoke into the hive. Stop that part of the door up with wet clay, which the tin spout does not fill, that none of the smoke may get out. The bees, at first, will make a great buzzing; in about five minutes all will be still as death. Lift the hive gently off, and turn those bees which have fallen on to the bottom board into a large white dish. They will be quite harmless and still, as if they had been burned with brimstone; but the fungus does them no harm, it only makes them drunk, which is very good for bees, though bad for men, as they get well in twenty minutes, have no headache the next morning, and all the merrier afterwards, and it was not their fault they were so overtaken. Look for the queen bee, and let some one help you as also to cut out the combs, and sweep the bees off, for many hands, as well as eyes, are better than one. Put her softly on one side, and sweep all the other stupid bees with a feather into the dish. Then cut the combs carefully, and if you have not found the queen, look sharp on each comb. Nine times out of ten she does not fall down, but holds fast to the top of the hive, in the very middle. When you have found her, use *her tenderly*, for on her the lives and happiness of thousands depend; then go on with your work. Pour the bees all back into the hive, and set it in its old place till the evening, leaving little bits of comb sticking to the top of the hive, as they will cluster round this, like a new swarm, and will set about clearing out the wax, and putting the hive straight as fast as they can. In the evening blow a little smoke into the strong hive, which stands next to them; when the bees are quiet, turn it up gently, and pour some honey and water into the combs. Put three breaks on the bottom board, so that when you set the hive down again no bees may be crushed; then take the hive from which you took the combs in the morning, and, with one smart blow, knock all the bees out upon the bottom boards of the hive whose bees you have sugared. Set their hive gently in its place, on the bricks, over the bees you have just knocked out; they will begin to lick the first drops of honey which trickle down, and will be led up by the scent of that which you have poured into the combs, to mix themselves with the other bees."

SUMMER MIGRANTS.—Our first swallows reached here on 9th April, and the cuckoo on 17th April, *Jeune Duprez*, hybrid perpetual, roses in bloom on an open wall here, on 20th April.

Jersey. H. E. A.

DISEASES OF GOLD FISH.—In answer to your correspondent respecting the fungus on gold or other fish, I have often lost by this well-known disease hundreds of fish; one of my customers at Louth, in Lincolnshire, has written me a long account of how he has treated the disease: First, he took the fish out of the aquarium, and carefully washed it all over with brine or very salt water; he then introduced them into a large cistern of fresh water, and has found them recover; I have often taken out carp and given them a swim in one of my large marine aquariums, then by putting them into plenty of fresh water, and keeping them in a dark cellar, they recover. I had a customer whose little goldfish lost its tail, and every fin twice in eighteen months, and it recovered by changing the water each day. I have a pond in Sussex which has a iron spring at the head of it; this, I fear, is one of the causes of disease, for if a bough or a few leaves fall in, the fungus grows on it wonderfully fast. I fear that the disease is promoted by the water passing through the iron pipes of London. If the aquarium is well stocked with suitable plants, and a little boiled water is introduced once in one or two weeks to keep up the evaporation, and the water is not changed for five or six years, so much the better. No disease will appear if the food and decomposed vegetation is removed. G. H. KING.

THE KESTREL (*Falco Tinnunculus*).—This is the commonest of our British hawks, and may be found in all parts of our country, as well as in every quarter of the globe. It builds no nest, but lays its eggs, which are four or five in number, and of a light colour speckled and blotted with red, in holes in rocks, and sometimes in the deserted nests of crows and magpies. This bird, though naturally bold and fierce, is easily tamed. One that I kept for some time, after having obtained its liberty, would not leave the place, but, when hungry, flew down and took food from the hand, which it carried to some neighbouring tree to eat at its leisure. In June, 1866, I found a dead chicken in a nest containing four young, which proves that the kestrel is occasionally guilty of depredations in the poultry-yard, as well as the sparrow-hawk. A sparrow-hawk that I kept in confinement allowed a small turtle-dove to roost on the same perch without offering to offend it. R. W. B.

TROUT LIVING IN SALT WATER.—Accidentally in showing a trout to a customer (Mrs. Tidcombe) let it fall in the yard into a cistern of salt water, 5 feet deep and 5 feet long, containing about 500 gallons—it had come up the day before in barrels fresh from the sea. The trout lived in the water three days and nights. It was shown to several persons alive in the sea water, and the third day Mrs. Tidcombe and friend saw it. I have had a plaster cast taken of the trout, which was exhibited with some young trout of my own breeding to a Natural History Society, and proved of great interest. I mention this, as the air-bladders in different fishes is one of the causes, I believe, of their living in sea-water. It is very easy to acclimatize sticklebacks, adding sea-water gradually; but carp I could never succeed with, though I have often tried them. G. H. KING.

Aquaria Establishment, 100, Gt. Portland St.

THE LITTLE BITTERN, AND PURPLE CRESTED HERON.—This little heron is so rarely met with in Cornwall that its occurrence deserves a record. Since 1833 I have not succeeded in procuring a specimen, although pretty much on the watch for rare birds. Last spring, however, I had the good fortune to obtain a perfect plumaged male bird from one of the Scilly Isles; last month a bird in similar plumage was obtained from this immediate neighbourhood, and last evening I received a note from Mr. F. V. Hill, of Helston, reporting the capture of an adult female found in an exhausted state on a beach near the Lizard; near the same spot was shot, a few weeks since, a female purple-crested Heron, with the ovarium full of eggs.

Golden Oriole at Scilly.—Three of these birds have been observed together, one in very bright plumage, on the grounds of the lord proprietor, during the past week.

Hoopoe at the St. Michael's Mount.—These birds are seen every spring in the Land's End district; one was obtained this spring at St. Michael's Mount.—

EDW. HEARLE NOAD, Penzance.

May 14, 1867.

INSTINCT IN A ROOK.—A labourer on the estate of a relation of mine, caught a young squab which had been blown out of its nest during a gale of wind. He took it home and reared it: and it now lives, with its wings clipped, in his cottage. Regularly every building season Mr. Rook brings in a lot of straw twigs, pieces of cloth or rags—in fact, anything it can get hold of, and essays to build a nest on the bars under the seat of a chair, where it gravely sits till dislodged by the "missus," who objects to the litter without looking at the performance from a scientific point of view. A. G. H.

PRESERVATION OF SKINS.—Corrosive sublimate dissolved in alcohol (strong whisky or brandy) is a very effectual, as well as simple, preparation for preserving the skins of birds and quadrupeds; it also excellently preserves insects. It gives a peculiar odour very like that of apples to the object preserved.

R. W. B.

STATE OF THE WEATHER NEAR LONDON.

April and May.	Moon's Age.	BAROMETER.		TEMPERATURE.					Wind	Rain.	REMARKS.
				Of the Air.			of the Earth				
		Max.	Min.	Max	Min	Mean	1 foot deep	2 feet deep			
Thurs. 18	○	29.878	29.672	64	47	55.5	51	47	S.	.00	Very fine; densely clouded; overcast.
Friday 19	15	29.586	29.460	65	50	57.5	52	48	S.W.	.01	Very fine; strong S. W. wind; overcast.
Satur. 20	16	29.331	29.015	59	37	48.0	54	49	S.	.32	Cloudy and rather boisterous; densely overcast; boisterous, with rain.
Sunday 21	17	29.546	29.305	54	37	45.5	53	49	S.W.	.01	Low dusky clouds, and boisterous; very stormy at night.
Mon. 22	18	29.790	29.714	61	42	51.5	52	49	S.W.	.05	Clear, with cold wind; overcast; rain at night.
Tues. 23	19	29.735	29.712	64	44	54.0	52	49	S.W.	.12	Overcast; showery; fine; strong S.W. wind.
Wed. 24	20	29.659	29.580	63	43	53.0	53	50	S.W.	.18	Heavy clouds; with showers; masses of dark and white clouds; rain.
Thurs. 25	21	29.818	29.693	53	42	47.5	53	49	N.	.01	Hazy and damp; overcast; densely overcast at night.
Friday 26	22	29.760	29.646	57	42	49.5	51	49	E.	.02	Hazy; overcast; slight rain at night.
Satur. 27	☾	29.523	29.484	60	29	44.5	52	49	S.W.	.03	Cloudy; masses of white clouds; very fine at night.
Sunday 28	24	29.727	29.370	61	30	45.5	52	49	E.	.00	Foggy; overcast; very fine at night.
Mon. 29	25	29.830	29.786	65	32	48.5	51	48	N.	.04	Fine; exceedingly fine throughout.
Tues. 30	26	29.747	29.664	64	36	50.0	52	49	W.	.12	Cloudy; white and dusky clouds; rain at night.
Wed. 1	27	29.954	29.870	62	33	47.5	52	49	N.W.	.00	Cloudy and damp; cloudy; very fine at night.
Thurs. 2	28	30.051	30.027	65	40	52.5	52	49	N.E.	.00	Very fine; overcast; fine at night.
Friday 3	29	30.116	30.072	70	37	53.5	53	50	S.	.00	Overcast; cloudless and very fine; fine.
Satur. 4	●	30.125	30.003	68	39	53.5	54	50	S.E.	.00	Very fine throughout.
Sunday 5	1	29.965	29.889	75	47	61.0	55	51	S.E.	.00	Very fine throughout; warm at night.
Mon. 6	2	29.905	29.878	81	49	65.0	56	52	S.E.	.00	Very fine; exceedingly fine; masses of black clouds.
Tues. 7	3	29.958	29.880	82	51	66.5	56	52	S.E.	.00	Exceedingly fine; cloudless and hot.
Wed. 8	4	29.866	29.842	82	42	62.0	57	53	S.	.00	Very fine; hot and dry; fine at night.
Thurs. 9	5	29.952	29.825	75	47	61.0	57	53	S.	.00	Cloudless and very fine; exceedingly fine throughout.
Friday 10	☽	29.778	29.597	79	47	63.0	57	53	S.	.52	Cloudy and hot; thunder shower in forenoon; overcast.
Satur. 11	7	29.776	29.461	69	48	58.5	58	54	S.W.	.00	Heavy thunder-storm 4—5 A.M., cloudy; fine at night.
Sunday 12	8	29.444	29.341	58	43	50.5	59	54	S.E.	.07	Slight rain; densely overcast throughout; rain.
Mon. 13	9	29.685	29.523	51	44	47.5	58	54	N.E.	.01	Overcast; hazy; densely overcast at night.
Tues. 14	10	29.803	29.723	52	40	46.0	55	53	N.E.	.00	Overcast and cold; cloudy; cold at night.
Wed. 15	11	29.916	29.620	53	40	46.5	54	52	N.E.	.00	Overcast and cold; cloudy, cold, and dry; overcast at night.

THE SONG OF BIRDS.

IN some simpler age, poets may go back, like the old Minnesingers, to the birds of the forest, and learn of them to sing. And little do most of them know how much there is to learn; what variety of character, as well as variety of emotion, may be distinguished by the practised ear, in a 'charm of birds' (to use the old southern phrase), from the wild cry of the missel-thrush, ringing from afar in the first bright days of March, a passage of one or two bars repeated three or four times, and then another and another, clear and sweet, and yet defiant (for the great 'storm-cock' loves to sing when rain and wind is coming on, and faces the elements as boldly as he faces hawk and crow)—down to the delicate warble of the wren, who slips out of his hole in the brown bank, where he has huddled through the frost with wife and children, all folded in each other's arms like human beings, for the sake of warmth—which, alas! does not always suffice; for many a bunch of wrens may be found, frozen and shrivelled, after such a winter as this last. Yet even he, sitting at his house-door in the low sunlight, says grace for all mercies (as a little child once worded it) in a song so rapid, so shrill, so loud, and yet so delicately modulated, that you wonder at the amount of soul within that tiny body; and then stops suddenly, as a child who has said its lesson, or got to the end of the sermon, gives a self-satisfied flirt of his tail, and goes in again to sleep.

Character? I know not how much variety of character there may be between birds of the same species, but between species and species the variety is endless, and is shown—as I fondly believe—in the difference of their notes. Each has its own speech, inarticulate, expressing not thought but hereditary feeling; save a few birds who, like those little dumb darlings, the spotted flycatchers, who have built under my bed-room window this twenty years, seem to have absolutely nothing to say, and accordingly have the wit to hold their tongues; and devote the whole of their small intellect to sitting on the iron rails, flitting off them a yard or two to catch a butterfly in air, and flitting back with it to their nest.

But listen (to return) to the charm of birds in any sequestered woodland, on a bright forenoon in June. As you try to disentangle the medley of sounds, the first, perhaps, which will strike your ear will be the loud, harsh, monotonous, flippant song of the chaffinch, and the metallic clinking of two or three sorts of titmice. But above the tree-tops, rising, hovering, sinking, the woodlark is fluting, tender and low. Above the pastures outside the skylark sings—as he alone can sing; and close by, from the hollies rings out the blackbird's tenor—rollicking, audacious, humorous, all but articulate. From the tree above him rises the treble of the thrush, pure as the song of angels: more pure, perhaps, in tone, though neither so varied nor so rich, as the song of the nightingale. And there, in the next holly, is the nightingale himself: now croaking like a frog; now talking aside to his wife on the nest below; and now bursting out into that song, or cycle of songs, in which if any man finds sorrow, he himself surely finds none. All the morning he will sing; and again at evening, till the small hours, and the chill before the dawn: but if his voice sounds melancholy at night, heard all alone, or only mocked by the ambitious black-cap, it sounds in the bright morning that which it is, the fulness of joy and love. True, our own great living poet tells us how—

> In the topmost height of joy
> His passion clasps a secret grief,—

and Coleridge may have been somewhat too severe when he guessed that—

> Some night-wandering man, whose heart was pierced
> With the remembrance of a grievous wrong,
> Or slow distemper, or neglected love
> (And so, poor wretch, filled all things with himself,
> And made all gentle sounds tell back the tale
> Of his own sorrow)—he and such as he,
> First named these sounds a melancholy strain,
> And many a poet echoes the conceit.

But that the old Greek poets were right, and had some grounds for the myth of Philomela, I do not dispute, though Sophocles, speaking of the nightingales of Colonos, certainly does not represent them as lamenting. The Elizabethan poets, however, when they talked of Philomel, 'her breast against a thorn,' were unaware that they and the Greeks were talking of two different birds—that our English Lusciola Luscinia is not Lusciola Philomela, which (I presume) is the Bulbul of the East. The true Philomel hardly enters Venetia, hardly crosses the Swiss Alps, ventures not into the Rhine-land and Denmark, but penetrates (strangely enough) further into South Sweden than our own Luscinia: ranging meanwhile over all Central Europe, Persia, and the East, even to Egypt. Whether his song be really sad, let those who have heard him say. But as for our own Luscinia, who winters not in Egypt and Arabia, but in Morocco and Algeria, the only note of his which can be mistaken for sorrow, is rather one of too great joy; that cry, which is his highest feat of art, which he cannot utter when he first comes to our shores, but practises carefully, slowly, gradually, till he has it perfect by the beginning of June; that cry, long, repeated, loudening and sharpening in the intensity of rising passion, till it stops suddenly, exhausted at the point where pleasure, from very keenness, turns to pain.

How different in character from his song is that of the gallant little black-cap in the tree above him. A gentleman he is of a most ancient house, perhaps the oldest of European singing birds. How perfect must have been the special organisation which has spread, seemingly without need of alteration or improvement, from Norway to the Cape of Good Hope, from Japan to the Azores. How many ages and years must have passed since his forefathers first got their black caps? And how intense and fruitful must have been the original vitality which, after so many generations, can still fill that little body with so strong a soul, and make him sing as Milton's new-created birds sang to Milton's Eve in Milton's Paradise. Sweet he is, and various, rich, and strong, beyond all English warblers, save the nightingale: but his speciality is his force, his rush, his overflow, not so much of love as of happiness. The spirit carries him away. He riots up and down the gamut till he cannot stop himself; his notes tumble over each other; he chuckles, laughs, shrieks with delight; throws back his head, droops his tail, sets up his back, and sings with every fibre of his body: and yet he never forgets his good manners. He is never coarse, never harsh, for a single note. Always graceful, always sweet, he keeps perfect delicacy in his most utter carelessness.

And why should we overlook, common though he be, yon hedge-sparrow, who is singing so modestly, and yet so firmly and so true? Or cock-robin himself, who is here, as everywhere, honest, self-confident, and cheerful? Most people are not aware, one sometimes fancies, how fine a singer is cock-robin now in the spring time, when his song is drowned by, or at least confounded with, a dozen other songs. We know him and love him best in winter, when he takes up (as he does sometimes in cold, wet summer days) that sudden wistful warble, struggling to be happy, half in vain, which surely contradicts Coleridge's verse:—

In nature there is nothing melancholy.

But he who will listen carefully to the robin's breeding song on a bright day in May, will agree, I think, that he is no mean musician; and that for force, variety and character of melody, he is surpassed only by black-cap, thrush, and nightingale.

And what is that song, sudden, loud, sweet, yet faltering, as if half ashamed? Is it the willow wren, or the garden warbler? The two birds, though very remotely allied to each other, are so alike in voice, that it is often difficult to distinguish them, unless we attend carefully to the expression. For the garden warbler, beginning in high and loud notes, runs down in cadence, lower and softer, till joy seems conquered by very weariness; while the willow wren, with a sudden outbreak of cheerfulness, though not quite sure (it is impossible to describe bird songs without attributing to the birds human passions and frailties) that he is not doing a silly thing, struggles on to the end of his story with a hesitating hilarity, in feeble imitation of the black-cap's bacchanalian dactyls.

And now—is it true that

In nature there is nothing melancholy?

Mark that slender, graceful, yellow warbler, running along the high oak boughs like a perturbed spirit, seeking restlessly, anxiously, something which he seems never to find; and uttering every now and then a long anxious cry, four or five times repeated, which would be a squeal, were it not so sweet. Suddenly he flits away, and flutters round the pendant tips of the beech-sprays like a great yellow butterfly, picking the insects from the leaves; then flits back to a bare bough, and sings, with heaving breast and quivering wings, a short, shrill, feeble, tremulous song; and then returns to his old sadness, wandering and complaining all day long. Is there no melancholy in that cry? It sounds sad: why should it not be meant to be sad? We recognise joyful notes, angry notes, fearful notes: They are very similar (strangely enough) in all birds. They are very similar (more strangely still) to the cries of human beings, especially children, when influenced by the same passions. And when we hear a note which to us expresses sadness, why should not the bird be sad? Yon woodwren has had enough to make him sad, if only he recollects it; and if he can recollect his road from Morocco hither, he maybe recollects likewise what happened on the road—The long weary journey up the Portuguese coast, and through the gap between the Pyrenees and the Jaysquivel, and up the Landes of Bordeaux, and through Brittany, flitting by night, and hiding and feeding as he could by day; and how his mates flew against the lighthouses, and were killed by hundreds; and how he essayed the British Channel, and was blown back, shrivelled up by bitter blasts; and how he felt, nevertheless, that 'that was water he must cross,' he knew not why: but something told him that his mother had done it before him, and he was flesh of her flesh, life of her life, and had inherited her 'instinct' (as we call hereditary memory, in order to avoid the trouble of finding out what it is, and how it comes). A duty was laid on him to go back to the place where he was bred; and he must do it: and now it is done; and he is weary, and sad, and lonely; and for aught we know thinking already that when the leaves begin to turn yellow, he must go back again, over the Channel over the Lands, over the Pyrenees, to Morocco once more. Why should he not be sad? He is a very delicate bird, as both his shape and his note testify. He can hardly keep up his race here in England; and is accordingly very uncommon, while his two cousins, the willow-wren and the chiff-chaff, who, like him, build for some mysterious reason domed nests upon the ground, are stout, and busy, and numerous, and thriving everywhere. And what he has gone through may be too much for the poor woodwren's nerves; and he gives way; while willow-wren, black-cap, nightingale, who have gone by the same road, and suffered the same dangers, have stoutness of heart enough to throw off the past, and give themselves up to present pleasure. Why not?—who knows? There is labour, danger, bereavement, death in nature; and why should not some, at least, of the so-called dumb things know it, and grieve at it as well as we?—Rev. C. Kingsley in *Frazer's Magazine*, June.

ORNAMENTAL GRASSES.

Of late years public taste has been turned to the advantageous effect of grasses in landscape gardening. Ferns had the credit of first winning attention from colour to form, and grasses next stepped in to confirm the preference for grace and elegance over gaudy colouring. We seldom now find a velvet lawn without its suitable contrast of a clump of Pampas-grass, either standing as an object of solitary beauty, or grouped with shrubs in a verdant background.

This beautiful plant is now so thoroughly established as a general favourite, that we offer remarks on its culture, culled from the *Gardeners' Magazine*, with a full confidence in their general acceptability.

The seeds must be sown in pots, and covered very lightly with sandy loam and peat. Then the pots must be placed in a slight heat till the blades are well developed. The young plants must next be separated, and only a few put into each pot; a cool frame is best adapted to them in this stage, and they require to be well watered. On being finally planted out, the place must be prepared for them with plenty of mellow loam, and must be in a moist situation. This grass has the male and female flowers on different plants. The latter is the one generally preferred, as best suited to our climate. It soon developes a large circular tuft of leaves, which attain a length of several feet, and bend outwards in the style so much admired in the coronal ferns, until the abundance of arching foliage resembles the graceful streams of a fountain. From the centre of this arching group arise a number of perpendicular culms, the apices at first seeming only thickened, but shortly developing a folded sheath, within which reposes the close-packed flower-buds; these culms shoot upwards with such rapidity, that they have been known to grow an inch in twenty-four hours, and they attain their full height of from five to seven feet in September. Then the sheath opens gradually, and the inflorescence emerges by degrees, at first as a closely-packed head, then exhibiting its complex structure of branches and buds, and by the end of October developing its full glory of spreading panicle a foot long, and numerous feathery flowers, so white and glossy as to shine like silver, and so lightly mounted on the slender branches that they wave and tremble in every zephyr. The male plant differs in the foliage, being less graceful and the inflorescence later in opening. The latter habit unfits the plant for out-door culture in Britain, for it leaves little chance of the flowers being perfected before the early frosts; and the culms, being then full of sap, are unable to stand the cold, and so perish before the flowers can expand. The best way of utilizing the beauty of the male plant is to cut the unopened panicles before the coming of the frost. The heads should then be dried, and the sheaths carefully stripped off; the young florets lying snug within seem made of frosted silver, but so closely packed that they present the appearance of a solid body. But when this compressed crowd of silver blossoms is shaken gently and repeatedly, they separate, and the true form of branching rachis soon becomes developed. Thus treated, the heads which would have perished in a night, leaving their latent beauty undeveloped and almost unsuspected, become the most lovely objects for drawing-room decoration possible. Mr. Johns recommends this treatment most highly.

In the *Cottage Gardener's Magazine*, the botanical name of the Pampas-grass, *Gynerium argenteum*, is said to be derived from two Greek words, *gyne*, female, and *erion*, wool, because of the woolly stigma. The writer of the article takes great umbrage at the popular name Pampas-grass, for he says it is found in no part of the Pampas, but only upon the banks of the Parana and other rivers in South America.

The roots of this grass are wide-spreading, fibrous, and very numerous. The leaves are hard and spiny at the edges; they are about half an inch broad, and from six to eight feet long. So sharp are the spines, and the leaves of such strong texture, that they inflict severe cuts upon any hand rash enough to attempt to gather them.

Mr. Moore introduced the Pampas-grass into Britain, and Messrs. Henderson were among its first cultivators. It is quite hardy, but these experienced nurserymen find it advantageous to tie the leaves together at the end of autumn, so as to enclose the heart of the plant, and to wrap a mat around. This they open on favourable occasions, and remove it entirely in March. By this means the plant is able to produce its culms earlier, and the grower has the advantage of the beautiful panicles for a longer period.

Clumps of the Sugar-grass (*Holcus saccharatus*) form desirable objects in a landscape garden. This grass was introduced into Belgium from Shanghai, and thence into England a few years ago. It is extensively cultivated in the United States, attaining there a height of from eight to sixteen feet, but in Europe it seldom exceeds eight feet, and a dull or cold season dwarfs it greatly. The culm is straight, the leaves flag-like, flexuous, drooping and bending most gracefully in the manner of those of the *Zea Mays*. The panicle is cone-shaped, the flowers densely crowded; the flowers are green at first but soon become tinged with purple, and very elegant. It can bear the frost very well after the flowers are expanded, but if the frost come before, the sap is still flowing, and the culms perish as certainly as those of the male Pampas grass. But with care in early sowing there is no danger of this, as it attains its growth quickly, and in a favourable season two crops may be obtained.

The Maize is well worth cultivation for its beauty and unique habit of growth ; its more sterling qualities are enumerated in the chapter on Cereals.

The Panick-grasses include a number of very beautiful species, some of considerable size and fitted for distant grouping, and many of smaller stature, well adapted for flower-borders, pots in the conservatory, and bouquets.—*British Grasses*, by Margaret Plues. London : Reeve & Co.

AN ELEPHANT HUNT.

WE halted after eight miles and a third of travel by trochiameter, and Chapman walking onward to the vlei a quarter of a mile further, found himself face to face with an elephant, and with nothing but a charge of shot in his gun. He returned at once for his rifle ; the hut we had commenced to shelter the ivory from the unloaded waggon was left to finish itself; the sketch I was busy with was put away at once, and we started at once in search—the Damara servants holding the dogs in leash while we beat the bush in all directions till elephants were seen to the eastward ; these proved to be a troop of cows, bearing only small ivory, and we returned to take up the spoor of the first that had been seen. A tempting shot at a duikerbok, was, of course, disregarded, and we pressed on to the northward over sandy ridges covered with shrub and bush, thorny or thornless as it happened. Chapman ran faster than I, and was beside less heavily loaded, and as we descended into the next valley I heard three shots in rapid succession, followed by the wild shrill scream of the enraged elephant and the angry baying of the dogs. Next minute I cleared the bush, and before me in the open hollow lay a broad pool, a very gem of the wilderness bordered by rich grass, and enclosed by an amphitheatre of forest—on the further side the people were rallying from the confusion into which the headlong charge of the elephant had thrown them, and the giant form of the huge animal was visible for a moment as he forced his way through the yielding bush beyond. Chapman who was loading his rifle shouted to me to take care, as the beast was savage ; and taking the track marked by his huge footsteps I followed into the bush. Chapman came up as soon as he had reloaded, but the dogs had been dispersed, and it soon became evident that we were on the spoor of an unwounded bull—the bushmen followed at full speed, and one of the Damara boys (Bill) joined them—with a nimbleness and hardihood which, had it only been supplemented by skill in the use of the gun must have successfully terminated the chase, but, for a white man on foot to keep up with these naked children of the desert was an impossibility, and both of us were soon distanced.

I held on for about ten miles, but finding that no one else was following, and that the elephant was most probably many miles ahead, and going at a rate that would render pursuit hopeless, I lay down after sunset from sheer weariness, and waited till the moon and stars shone through the clouds sufficiently to allow of my shaping a course homeward. After a time I heard the faint reports of guns fired by the Damaras sent out by Chapman to meet me, but at length these ceased, and darkness coming on, I was no longer able to avoid entanglement in the low, invisible grey thorn bushes ; I therefore spread a couch of grass, and as the night was not cold enough to make a fire necessary I slept very comfortably till daybreak enabled me again to see my way. During the night I had, of course, been unable to distinguish tracks, and had merely held a tolerably correct course across country, but now I crossed a spoor, which I knew to have been formed yesterday, and soon met some of our Damaras coming from the waggons. Kalokolo and a bushman relieved me of my gun, and I reached our outspan just as the cattle were being milked for early coffee. I learned, to my surprise, that Chapman himself had fired the guns that I had heard the previous night, the immense charge of powder—no less than fourteen drachms —accounting for the distance at which they were audible. He had, of course, been anxious, but the bushman had spoken up for me. "He has a beard like you, he cannot lose himself." The poor fellow little thought that the hirsute appearance of an Englishman was no guarantee of ability to find his way in the bush.

I was also told that the elephant on entering the hollow had been met by another, coming, all unconscious of the chase, to refresh himself at the water, and Chapman, keeping back the people as much as possible, had been obliged to fire across the vlei at the second, between one and two hundred yards distant, although the ivory of the first, notwithstanding a broken tusk, seemed forty pounds heavier than that of the intruder. At the second shot the people had run past him, and exposed themselves to a furious charge, Bill, after firing his shot, escaping with marvellous alacrity, but subsequently proving himself as bold and eager in pursuit as could be wished. The wrong elephant, however, was followed, and it was only when Chapman had given up the chase and was returning that the bushmen suddenly pointed to some object, and handed him his gun to shoot it, but another glance showed that it was the carcase of the first elephant lying within a few hundred yards of the spot where it had been wounded.

Breakfast was soon over, and collecting my drawing materials I started with Kalokolo and the bushmen, regretting only that my friend for want of his bath and other photographic apparatus, could not accompany me. Wanting the excitement of the chase, the length of hill and dale we traversed now seemed wearisome enough; the wild ducks on the placid surface of the vlei, scarcely noticed us as we passed, and a few hundred yards beyond it we first saw the gigantic carcase of which we were in quest, looming like a grey granite boulder above the bush. Of course I had seen elephants, but it had always been at my home and not theirs, and neither picture nor well-groomed black-skinned show specimen from India, had quite prepared me to stand for the first time, without a feeling of awe and wonder beside the mighty African thus fallen in his own domain. Masses of earth had been upturned by his broad feet, his column-like legs were stiffened in his tracks, the tusk on the lower side was buried in the soil. The head and curling trunk extended forward, leaving the broad forehead (flat or even convex and not indented like the Indian) nearly in a line with the body.

The ears which in the African are of enormous size, covered with their upper part nearly half the neck, the lobes actually meeting above the spine, the hinder part reaching to the "death spot" behind the shoulder, and the lower descending nearly to a level with the chest. The rough grey side deeply marked with wrinkles crossing each other like a network, and destitute of hair except a few solitary bristles, rose more like a rock than the skin of a lately living animal, so high that I could barely see the head of a man beyond it. A dark purple stain upon the lower side of the chest alone indicated the cause of death, the bullets having entered the shoulder now in contact with the ground. I wished at the moment for the companionship of Wolf, the artist of the beautiful illustrations in Anderson's "Lake Ngami," or some other artist more competent than myself to give in all their integrity the characteristics of the mighty animal; but only the Damara and bushmen were there, and their impatience I checked peremptorily till I had made a careful outline, allowing them to open the abdomen while I was working in the colours. The sun was just beginning to be warm, and the carcase had not swelled much; nevertheless the Bushman approached the flank with the caution of a practised fencer, springing aside with marvellous agility when he had made his blow. Nor was the caution vain, for the discharge of a fire-engine was nothing to what followed and I can easily believe in the cannon-like explosions I have been told of when the carcase that has been all day under a vertical sun is pierced for the first time. Before long the fat and sheets of the intestines were spread like blankets over every bush, tit-bits were broiled and eaten among the garbage in which the savages were revelling and delighting, especially in the wild songs that issued in sepulchral tones from the cavernous interior until the ribs were sufficiently bared to reveal to view those who were detaching the dainty morsels within them; but to me, I must confess, the most disenchanting sight of all was the flock of lovely butterflies with all their spiritual and Psyche-like associations fluttering fearlessly among them and feeding greedily as they on the most offensive portions.

I made another sketch while the hide, more than an inch thick, was being torn in planks from the ribs, and was just beginning to enjoy a bath in the vlei when the bushmen came down for the same purpose, the Damara alone thinking a wash a work of supererogation. At night we supped on steaks which were really superior to much of the beef we had latterly eaten, and as this was the first elephant at whose death I had been present, I asked Chapman to relinquish in my favour his right to the tail, which I preserved as a memento of the scene.—Thomas Baines, F.R.G.S., in *Land and Water*, June 8.

HOW TO GROW FERNS.

No plants are so suitable for indoor or town culture as ferns, hence no others are so popular, and those who have not had much experience in their treatment will not object to a few hints on the subject. There are two methods in which ferns may be cultivated, viz., in an open fernery, or in closed cases; but before adverting to either, it may be advisable to give a hint or two on raising ferns from spores. The German gardeners take a cube of turfy peat, about 1½ inch square, and this they dip in boiling water in order to destroy all the animal life which it contains; it is then laid in a flat saucer, and the spores are sprinkled upon the upper side. A small quantity of water is poured into the saucer, and the whole is covered with a bell-glass. A little water is required to be added from time to time, to compensate for evaporation, but great care must be taken to pour it in without washing the spores off the turf, and in five or six weeks a green moss-like substance will cover the turf, and the young ferns will gradually develope themselves.

Mrs. Helen Watney informs us that it is a curious fact that fern spores which have been gathered and dried three or four years, will, when sown, germinate more quickly than fresh spores.

Some persons employ a porous sandstone in the place of peat, and the lady to whom we have already alluded recommends cinders, for the following reasons:—"Sandstone almost invariably contains the germs of fungi, which hinder, and very frequently prevent, the development of the fern spores, and peat, unless prepared by dipping in boiling water, and thus destroying all life, is open to the same objection. Now, if cinders (which, if fresh, contain no fungi) are used, mixed with a suitable quantity of peat, subjected as above, the ferns will have a fair chance of proper development, for it is highly improbable that fungi will obstruct their growth. I have found that peat, if used alone, becomes soddened; and as ferns, like all other plants cultivated in pots, require good drainage, that essential is obtained by the use of cinders mixed therewith." Many gardeners raise their ferns by sowing the spores on silver sand. We have known of many successes from the employment of sandstone, and some failures through the prevalence of fungoid growths; but of the admixture of cinders and peat, as above recommended, all the testimony has hitherto been favourable.

The cultivation of ferns in the open air demands but little special comment. A sloping bank, shaded from the direct rays of the sun, in a sheltered situation, and where possible in the neighbourhood of a pond, stream, or ornamental water, is the first object to be regarded. If these conditions cannot be fulfilled, the situation should, at the least, be damp and shady. It is customary to plant ferns in an artificial rock-work; but, when this is done, the mound should *not* be so constructed that every drop of moisture is carefully drained away, but rather to be the face of a slope from higher ground, so that the drying winds do not whistle all around it, and extract every atom of water. If the spot is carefully selected, and a light soil provided for the interstices of the stone-work, there is very little to fear. The most luxuriant plants of the Royal Fern which we have ever seen under cultivation were placed amongst the rough stone-work of a large rustic fountain, and here they flourished apparently as well as in their native "homes and haunts." Many a window, in towns, from which the prospect is only a blank wall, might be made to look cheerful and comfortable by raising an outdoor fernery of the hardiest species around it. Under such conditions, a humble imitation might be made of the fernery windows on the ground floor of the South Kensington Museum.

Ferns may be grown in pots with great success. The common deep flower-pots are as good as any for the purpose, and it is as injurious to put in too many "crocks" for drainage as too few: moderation is best, and, as a rule, what would be considered good drainage for ordinary pot plants will answer very well for ferns. From whatever soil they may be taken, it is surprising how soon ferns will accommodate themselves to the loam and peat in which they are usually grown. The rock-loving species are best grown in a mixture of broken brickbats, old mortar, and sandy loam, taking care that they are not stinted of moisture in the summer, and but slightly moistened during the winter. Many species are very impatient of any moisture at their crowns, so that it is a good plan to keep the crowns elevated to the level, or a little above the level, of the pot. We have found that all the plants which required to be transferred to larger pots—an operation which becomes essential every two or three years—may be removed as well in the early spring as at any other season of the year, and much better than during the winter. A great deal is said and written about plenty of light and air, but too much of either is certainly a disadvantage in fern culture. At all times of the year, except about three months in the winter, we should certainly recommend shading them more or less, according to the strength of sunlight. Water is another point on which theory and practice often differ. Ferns will certainly never flourish in a dry powdery condition of the soil, nor will they continue to do so when it is permanently saturated with moisture. A moist atmosphere is better than all the syringing in the world: in fact, the continual squirting of water over the foliage and crowns of many ferns, except the hardiest, is simply dooming them to death. Rain-water in moderation, no direct glare of sunlight, gradual admission of air when the temperature is too high, and the careful des truction of small slugs and all similar pests, are the best rules to remember.

For the introduction of the method of growing plants in closed cases we are indebted to Mr. N. B. Ward, from whom such cases are generally denominated Wardian cases. There are two errors commonly entertained with regard to the growth of ferns in closed cases. One error exists in the belief that the cases must be airtight; and the other, that it is quite sufficient, at stated intervals, to let in upon them a deluge of water.

The form of the case may be accommodated to individual taste. Some prefer the octagonal, some the quadrangular. Let each consult his or her peculiar taste; and we will describe one to serve as a model either to imitate or shun, as taste may prompt, the object being rather to illustrate the principle of construction, &c., than to establish any orthodox standard.

First of all construct a strong wooden box, 30 inches in length, 17 inches in width, and 5 inches deep. Cover it well inside with pitch, and outside with paint. At one end, and on a level with the bottom, insert a small stop-cock or a wooden plug, so as to draw off, if necessary, any superfluous water. Lay on the bottom, to the depth of one inch, any drainage material. Then fill to the top with soil. Some will prefer sifted cocoa-nut refuse and charcoal, others a mixture of fibrous peat and sand, whilst others will be content with a light loam. In this the ferns may be planted, according to taste. The upper portion, which consists of a zinc framework glazed, may rest upon a ledge, half an inch below the level of the top in the interior of the wooden box. Or if the case is smaller than the above dimensions, and the top not too heavy, it may rest on the soil, leaving a space of half an inch all round between the box and the cover: by this means the external air passes and is filtered through the soil before it enters the case. Whatever may be the form of the upper portion of the case, it is always advisable to have at each end, at the top, a strip of perforated zinc, about an inch in depth, and extending across the case. This should be furnished with a shutter inside, so contrived that it may be opened or closed at will. This arrangement will obviate the cloudy appearance of the glass, which in perfectly closed cases often prevents the contents being seen, and will, moreover, be advantageous to the ferns. As the consumption of water is small, such a case *seldom* will require its addition, and *never* improve under a deluge. Any excess of water which may have been supplied may be drawn off by the plug or stopcock at the end.

Planting the case may next occupy attention; and this may be done either by inserting potted ferns, and covering the pots with the soil, or employing only cocoa-nut refuse for the purpose; or the ferns may be transplanted directly into the soil. Special precautions must be taken with species having creeping rhizomes, which must be provided with little elevations on which to be planted.

The selection of species must depend greatly on the localisation of the fernery when completed. If it is to be placed in a room in which a fire is constantly kept during the winter, more tender species may be cultivated than if the case is intended to take its chance in some room whence fires are generally excluded. Many foreign species may be added with advantage to those which are natives of this country, half of which, at the least, are too large for any moderate-sized fernery.

In placing this fernery, when completed, the full glare of sunlight should be studiously avoided: a northern aspect is good, northwestern is perhaps the best. When travelling through North Wales in search of ferns, we ascertained the aspect of a great number of flourishing fern patches by means of a pocket compass, and found invariably that it was northwest; a fact which we have taken care to remember.

It is by no means essential that an elaborate fern-case should be constructed at a great expense to cultivate a few ferns. For a few shillings a very respectable cottage fernery may be established. Two or three ferns may be planted in a common flower-pan, which is naturally porous, not being glazed either inside or out. This may be placed in a round earthenware dish, with the space of an inch all around between the outside of the pan and the inside of the dish. This intervening space may be filled with bog moss (*Sphagnum*), and a bell-glass over all, or only over the inner pan. The common hand-glass, with a greenish tint, are preferable to those which are colourless, and whose sole recommendation lies in their higher price. A hole may be drilled with advantage through the handle at the top of the glass, for ventilation. A piece of soft wood will easily stop it if desired. When water is added, it should be poured over the bog moss in the outer circle only, enough moisture will then find its way through the porous sides of the inner pan; and a very convenient and economical little fernery, wanting scarcely any attention, will be the result.—*A Fern-Book for Everybody*, by M. C. Cooke. London: Warne

PEARLS.

PEARLS are occasionally found in the common mussel, and also in the oyster, scallop, cockle, periwinkle, and pinna; but they are generally inferior in size and quality to those of the fresh-water pearl-mussel (*Unio margaritiferus*); and Mr. Beckman, in his "History of Inventions," states that real pearls are found under the shield of the sea-hare (*Aplysia*), as has been observed by Bohadsch, in his book, "De Animalibus Marinis" (Dresdæ, 1761.) Our Scotch pearl-fishery has, within the last few years, been most successfully revived, and in 1860 Mr. Moritz Unger, a foreigner, on making a tour through the districts where the pearl-mussel abounds, found that the pearl-fishing was not altogether forgotten, many of the people having pearls in their possession, of which they did not know the value. He purchased all he could obtain; consequently, in the following year, many persons devoted their spare time to pearl-fishing, and during the summer months made as much as £8 to £10 weekly. The summer of 1862 was most favourable for fishing, owing to the dryness of the season, and the average price was from £2 6s. to 10s., £5 being a high price. They now fetch prices varying from £5 to £20. The Queen purchased one Scotch pearl for 40 guineas, others at high prices have been bought by the Empress of the French, and the Duchess of Hamilton, and Mr. Unger has a necklace of these pearls, valued at £350. Pearl-mussels are found in Lochs Earn, Tay, Rannoch, and Lubnaig, and in the Don, the Leith, and in many of the other Scotch streams; also in some of the Welsh rivers, from whence I have received fine specimens; in Ireland, near Enniskillen, and in the river Bann, which is noted for its fine pearls. They wade for them in the shallow pools, or take them by thrusting a long stick between the valves when the shell is open. When a number have been collected, they are left to decompose, when the pearls drop out. They may also be found in Kerry, in Donegal, in the Moy, near Foxford, and in many of the Irish rivers; and Mr. Buckland states in the "Field," December 10th, 1864, that they abound near Oughterard, and that a man called "Jemmy the pearl catcher," told him he knew when a mussel had a pearl in it, without requiring to open it first, because "she (the mussel), sits upright with her mouth in the mud, and her back is crooked," that is, it is corrugated like a cow's horn. Bruce in his "Travels," observes that the pearl-fishers of Bahrein informed him that they had no expectation of finding a pearl when the shell was smooth and perfect, but were sure to find some when the shell was distorted and deformed, and he adds, that this applies equally to the Scotch pearl-mussels. In France they also collect from the pearl-mussels, and they generally sell them as foreign pearls. At Omagh, in the north of Ireland, there was formerly a pearl-fishery, and Gilbert, Bishop of Limerick, about 1094, sent a present of Irish pearls to Anselm, Archbishop of Canterbury. Scotch pearls were in demand abroad, as early as the twelfth century. Suetonius says that the great motive of Cæsar's coming to Britain was to obtain its pearls, and states that they were so large that he used to try the weight of them by his hand, and dedicated a breastplate made of them to Venus Genetrix. According to Pliny, the island of Taprobane (Ceylon), was most productive of pearls, and he considers that the most valuable were those found in the vicinity of Arabia, in the Persian Gulf.

Oriental pearls are found in the *Meleagrina margaritifera*, or pearl oyster; and Chares of Mytilene, in his seventh book of his "Histories of Alexander," tells us that, "in the Indian Sea, and also off the coast of Armenia, Persia, Susiana, and Babylonia, a fish is caught very like an oyster, large, and of oblong shape, containing within its shell flesh, which is plentiful, white, and very fragrant, and from it the men pick out white bones, called by them pearls, and of these they make necklaces and chains for the hands and feet, of which the Persians are very fond, as are the Medes and all Asiatics, esteeming them as much more valuable than golden ornaments." Occasionally, they are called stones and bones by Greek authors, and Tertullian calls them maladies of shell-fish and warts—*concharum vitia et verrucas*. Pliny states that when pearls grow old they become thick, and adhere to the shell, from which they can only be separated by a file; again, that pearls which have one surface flat and the other spherical, opposite to the plane side, are for that reason called tympania, or tambour-pearls, "quibus una tantum est facies, et ab ea rotunditas, aversis planities, ob id tympania mominantur." The "tympana," or hand-drums of the ancients, were often of a semi-globular shape, like the kettle-drums of the present day. Shells which had pearls still adhering to them were used as boxes for unguents. Long pear-shaped pearls, called elenchi, had their peculiar value, resembling the alabaster boxes in form, which were used for ointments. Ear-rings were invented by the Roman ladies, called "crotalia, or castanet pendants, from the pearls rattling as they knocked against each other."

The story of Cleopatra swallowing the pearl, in order that she might say she had expended on a single entertainment ten millions of sesterces, is too well known to require repeating here; suffice it to say, that Pliny informs us that before the time of Antony and Cleopatra, Clodius, the son of the tragic actor, Æsopus, had done the same at Rome; "he having dissolved in vinegar (or at least, attempted to do so), a pearl worth about £8,000, which he took from the earring of Cœcilia Metella." Pliny further adds, that, by way of glorification to his palate, Clodius Æsopus was desirous of trying what was the taste of pearls, and as he found it wonderfully pleasing, that he might not be the only one to know it, he had a pearl set before each of his guests for him to swallow." It was not unusual for the Romans to adorn their horses and other favourite animals, with splendid necklaces; and we are told that Initatius, the favourite horse of the Emperor Caligular, wore a pearl collar. The Roman ladies even wore pearls at night, that in their sleep they might be conscious of the possession of these valuable gems. Julius Cæsar prohibited the use of purple and pearls to all persons who were not of a certain rank, and the latter also to unmarried women. From the twelfth to the sixteenth centuries, extravagance in jewellery was carried to an unlimited extent at the Courts in Europe, and from the reign of Francis I. to that of Louis XIII., the greater part of the jewels worn were set with pearls, and these latter were worn in preference to all other ornaments, until the death of Maria Theresa of Austria. The French call irregular-shaped pearls "Perles barroques," and these malformations were ingeniously utilised by the fanciful taste of the Cinque Cento period. No doubt many of my readers will remember the specimens exhibited in the loan collection at the South Kensington Museum. One was a Cinque Cento pendant, in the form of a siren; the head, neck, and arms of white enamel, the body made of a very large "pearl barroque," and a fish's tail enamelled and set with rubies. It belonged to Colonel Guthrie, and is of fine Italian work of the sixteenth century. Another, in the possession of Messrs. Farrer, was a gold pendant jewel in the form of a ship with three masts, a large pearl barroque forming the hull, &c. The wedding dress of Anne of Cleves was "a gown of rich cloth and gold, embroidered with great flowers of large orient pearls." The unfortunate Mary, Queen of Scots, possessed pearls which were considered the finest in Europe, and these were purchased in a most iniquitous manner by Queen Elizabeth from the Earl of Moray, for a third part of their value. Miss Strickland (in her "Lives of the Queens of Scotland," pages 82 and 83, vol. vi.), says that if anything further than the letters of Drury and Throckmorton be required to prove the confederacy between the English Government and the Earl of Moray, it will only be necessary to expose the disgraceful fact of the traffic for Queen Mary's costly parure of pearls, her own personal property, which she had brought from France. A few days before she effected her escape from Lochleven Castle, the Regent sent these with a choice selection of her jewels, very secretly, to London, by his trusty agent, Sir Nicholas Elphinstone, who undertook to negotiate their sale with the assistance of Throckmorton. Queen Elizabeth had the first offer of them, and the French Ambassador thus describes them:—"There are six cordons of large pearls strung as paternosters, but there are five-and-twenty separate from the rest, much finer and larger than those which are strung. These are, for the most part, like black muscades" (a very rare and valuable variety of pearl, with the deep purple colour and bloom of the muscatel grape.) They were appraised by various merchants, but Queen Elizabeth was determined to have them at the sum named by the jeweller, though he would have made his profit by selling them again. Others valued them at three thousand pounds sterling, some Italian merchants at twelve thousand crowns, and a Genoese at sixteen thousand crowns, but twelve thousand was the price Queen Elizabeth was allowed to have them for, and Catherine de Medicis was quite as eager to purchase these pearls as her good cousin of England, knowing they were worth nearly double the sum at which they had been valued in London, having presented some of them herself to Mary. She therefore used every endeavour to recover them, but the French Ambassador wrote to inform her that it was impossible to accomplish her desire of obtaining the Queen of Scots' pearls, "for as he had told her from the first, they were intended for the gratification of the Queen of England, who had been allowed to purchase them at her own price, and they were now in her hands." The possession of wealth and jewels is not always a source of happiness or benefit to their possessors, if we may judge "from the above mentioned fact in history, and, indeed, it is even more clearly exemplified in the case of the eminent Mogul, who died of hunger during a grievous famine, which depopulated part of Guzerat. A large mausoleum or Mahometan tomb was erected to his memory in the suburbs of Cambay, with an inscription, telling us that during this terrible scarcity the deceased had offered a measure of pearls for an equal quantity of grain, but not being able to procure it, he died of hunger."

A pearl is described by Madame de Barrera, as nearly the size of a pigeon's egg, and pear-shaped, it weighed 250 carats, and was known as "La Peregrina," and belonged to the crown of Spain. It was brought from Panama in 1560, by Don Diego de Temes, who presented it to Philip II. "It was then valued at fourteen thousand ducats, but Freco, the King's jeweller having seen it, said it might be worth £14,000, £30,000, £50,000, or £100,000, as such a pearl was priceless." In 1779 a pearl, which from its shape was called the Sleeping Lion, was offered for sale at St. Petersburg, by a Dutchman, it weighed 578 carats, and was bought in India for £4,500. The largest pearl known, I believe, is the one which was exhibited at South Kensington Museum, in the loan collection, in the possession of A. J. B. Beresford Hope, Esq. It weighs 3 oz., is 2 inches long, 4½ inches in circumference, and is set as a pendant.—*Edible Mollusks of Great Britain*, by Mr. Lovell. Reeve & Co.

THE TARANTULA KILLERS OF TEXAS.

AN investigation of the extensive family of Mud Daubers would be an interesting and instructive study. It would necessarily include that of the various types of spiders, from the great hairy Mygale Hentzii, down to the smallest, almost microscopic species ; for nearly every type of spiders has its special enemy among the Mud Daubers.

The large, red-winged "Tarantula Killer" (the *Pompilus formosus* of Say) is, as far as I know, the largest of the dauber group. It takes its prey by stinging, thus instantly paralysing every limb of its victim. The effects of the introduction of its venom is as sudden as the snap of the electric spark. The wasp then drags it, going backwards to some suitable place, excavates a hole five inches deep in the earth, places its great spider in it, deposits an egg under one of its legs, near the body, and then covers the hole very securely. A young Tarantula Killer will be produced from this egg, if no accident befalls it, about the 1st of June of the ensuing year.

This large and conspicuous insect is everywhere in Texas called the Tarantula Killer, and is over two inches in length ; the head, thorax, abdomen, and long spiny legs are all black, while the wings are sometimes of a bright brown, with black spots at the tips. It is armed with a formidable sting, which it invariably uses in taking its prey. This sting does not kill the Mygale, but paralyses it—suspends all animation—and in this state, in a dry place, and at the proper temperature, it is in a condition to resist decomposition a long time. The entire group of Mud Daubers possess the power of paralysing their victims, and in that condition they store up their spiders, caterpillars, and other insects, which are to serve as food for coming generations.

The Tarantula Killer pursues several other species of the large ground spiders, but the Mygale Hentzii, or Tarantula, is his favourite.

I have sometimes found under shelving rocks, and other sheltered places, dauber's nests that were doubtless several years old. In some of the cells, where the egg had proved abortive, the spiders were there, still limber, with no signs of decomposition about them. They did not seem to be dead, but looked as if they could almost move their legs, and were perhaps not unconscious of their deplorable condition. I should be frightened at the prospect of being stung by any of the larger types of this group of insects. I have, however, known but a single instance of this kind. Several years ago a person was stung by a common black dirt dauber on the shoulder near the neck ; he complained of numbness in the part for a distance of some inches around the wound, but of no pain. Its effects lasted about twenty-four hours. I think it quite probable that the large Tarantula Killer would produce a more serious inconvenience, and perhaps paralyse the whole system. The Pompilus, however, is a good-natured insect, showing no signs of pugnacity, except when she has a fine fat Tarantula in hand, and then she only threatens violence by spreading out her red wings, and running a little way towards the intruder. She is quite tame, and will come familiarly in and about one's yard and house, dragging the prostrate Mygale under the floor, where she hides it from the intrusion of other Tarantula Killers, who would, if they could find it, take out the egg and put one of their own in its place, as they are remarkable for such thieving propensities.

The Mygale Hentzii, on the other hand, sometimes succeeds in capturing his great enemy, as I once noticed. When first observed, the Mygale had the Tarantula Killer, still alive, in his mouth, holding it by the back. The Tarantula seemed to be greatly elated at its success, which it manifested by capering about, and performing various other antics, such as running suddenly at anything or person that came near it, holding on to his victim all the time. The Tarantula Killer appeared to be conscious of her condition, and was, as far as I could discern, fully resigned to her fate, remaining perfectly quiet. I regretted that I could not wait to witness the finale of this affair : such cases do not often occur.

The Tarantula Killers have severe fights with each other. It occasionally happens, when one of them succeeds in capturing a Tarantula, that another one, or more, flying around in that vicinity, and smelling the odour that arises from the Tarantula Killer when she uses her sting, which resembles the odour of the paper-making wasp (Vespa), only much stronger, takes the scent like a dog, tracks the Tarantula, following it up closely, and makes a violent effort to get possession of the paralysed spider. A fight ensues, which occasionally terminates in the death of both parties ; at other times the contest lasts but a little while, as the stronger party drives off the weaker, and takes possession of the prey.

It is surprising to one who has been educated to believe that the faculty of reason belongs alone to man, to contemplate the consummate ingenuity which is displayed by these insects in their efforts to secure their eggs from the observation of their own thieving sisters, and to hide the food they have provided for their young during the period of its existence under ground.

The Tarantula Killer feeds upon the honey and pollen of the flowers of the Elder, and of *Vitis ampelopsis*, the Virginia Creeper; but its favourite nourishment is taken from the blossoms of Asclepias quadrifolium. This species of Asclepias blooms through the summer, and the Tarantula Killer seems to know the locality of every plant. If one finds on the prairie a plant of Asclepias quadrifolium in bloom, and watches ten or fifteen minutes, he will be almost certain to see a Tarantula Killer come to it. This insect requires considerable food, as its period of life extends from the 1st of June until November, or till the frost destroys all the flowers, when it seems to die for want of food, as it is often seen at this time crawling about in a very feeble state. I do not think any of them ever survive the winter, as they never appear earlier than June.—*The American Naturalist*, May.

COLOURS IN PLANTS.

Nimium ne crede colori is one of those many aphoristic sayings which people now-a-days take the liberty of heeding or of disregarding at their own sweet will and pleasure, and wholly independently of the sayings or doings of poets or philosophers; and when the soft velvety pile of a pansy, or the exquisite tints of a rose are in question, it is too much to expect one to heed the admonitions of those botanists who are apt to pooh-pooh colour in plants as beneath their notice, or at any rate as being insufficient to "furnish specific characters." In this latter point, indeed, we feel compelled to concur, not, however, without an impression that when more is known as to the mode of production of colour, its disposition in certain portions of the plant to the exclusion of others, and when the curious relations that exist between colour and form, as pointed out some years since by Dr. Dickie, are sufficiently worked out, then the botanists will have to alter their opinions; and colour, like the other attributes of the plant, will furnish its quota towards the sum of characters by which one set of plants is distinguished from another. It does so now to some extent, notably so in the case of seaweeds, but by-and-by its services in this way will, we doubt not, be better appreciated. In the meantime the increasing popularity of plants with brilliantly coloured foliage necessarily leads to the consideration as to how these varied hues are produced, and induces the cultivator to reflect on the power that he has to produce, modify, or obliterate these tints at will. The principal facts relating to the colouration of leaves are pretty well known to our readers, or, if not, they are readily accessible. Mr. Berkeley alluded to some of them at the last meeting of the Royal Horticultural Society, and our main object at present is to supplement his remarks by calling attention to some facts, not novel, indeed, but still worthy the consideration of the gardener, and which we have lately had the opportunity of testing by the examination of specimens kindly furnished to us by Mr. Wills.

We would specially call attention to the localisation of the colour in particular cells. Thus, in the Zonal Pelargoniums, not only is the colour distributed in a somewhat semicircular zone, but a microscopic section reveals that the coloured cells are almost entirely to be found just under the epidermis, especially on the upper surface of the leaf; no doubt in some cases they may be found elsewhere, but the spots mentioned are, so to speak, the head-quarters of the coloured juices, and the same thing holds good in the red cabbage and many other brightly coloured plants known to us.

This may be due to the more intense action of light on the surfaces of the leaf, though there are many difficulties in the way of accepting such a solution to which our space now forbids us to allude. Again, the anatomical structure of the leaf, so correctly described by Mr. Berkeley, does not fully explain the localisation of the colour; for while it is undoubtedly true that in most cases the coloured fluids are to be found in the prismatic cells to be found just beneath the upper skin of the leaf, yet they are not confined to those cells; and some of the Pelargoniums are destitute of cells of this form. But perhaps the leaf-stalk shows the greatest peculiarities in the position of the coloured juices. On submitting to the microscope a longitudinal slice of the pink leaf-stalk from one of Mr. Wills' seedlings we saw, what we had often seen before in other plants, that the coloured cells were arranged in longitudinal rows throughout the stalk, the rows being separated one from the other by colourless cells, so that the appearance was not unlike that of a ribbon border, so regular was the arrangement. It is very difficult to account for this arrangement, and we shall not attempt to do so at present.

There is one point upon which we should be glad to have further information, as we think probably there are more exceptions to be met with than we have ourselves encountered, and that point is as to the precise part of the cotyledons or seed leaves in which the red tint first makes its appearance. As far as we have seen in seedling plants of red zoned varieties, while in the perfect leaves the red tint first shows itself in the median zone of the leaf, in the case of the seed leaves and also in the case of the stipules, the red tint is first perceptible at or near the edges, and specially as regards the stipules near their points.

Other matters revealed, by an examination of Pelargonium leaves, not without significance for the thoughtful cultivator, are these :—

The pure white spots are due to the entire absence of chlorophyll, hence it is no wonder that if a seedling show itself with two wholly white seed-leaves that it speedily dies, because the due production of chlorophyll or leaf-green is well known to be intimately associated with the healthy development of the plant. Hence, as Mr. Wills says, "if the white is allowed to have its course, the plant will do no good for itself." Indeed, specimens sent to us by Mr. Wills show this conclusively; the green leaves having been removed and only the white ones suffered to remain, the effect has been to check the growth; and had the experiment been pursued longer, death must have ensued. This absence of chlorophyll, and attendant loss of vitality in the cells, as Mr. Grieve well remarked accounts for the puckered convex leaves of so many of the Silver Tricoloured Pelargoniums. To us it has also appeared, though in this matter our experience is in some degree opposed to that of others, that the red colouring matter is not produced unless there be at least some chlorophyll in the leaf; in other words, we have never seen a trace of pink colouring matter in leaves that are *absolutely* white, though in those that have even the faintest tinge of yellow, indicating the existence in small proportion of chlorophyll, the reddish tint may very often be met with. But while we have not satisfied ourselves of the existence of red colouring juices (or we may add of starch grains) in leaves which are entirely destitute of chlorophyll, we have frequently seen clusters of crystals or "raphides" in the colourless cells of the white leaves. If this be borne out, it will furnish an additional argument to those who look on rhapides as mere excretions. But this is running away from the subject of colour, and in order not to weary the patience of our readers, we dismiss the subject for the present, merely adding a record of a circumstance which has been made known to us by the courtesy of Mr. Bull, and which is very significant, and that is, that a pink tint may readily be produced in the silver-edged ivy-leaved Pelargoniums by placing the plants near to the glass, and thus exposing them fully to the action of light. In this plant the coloured juices may be seen to be contained in spheroidal or polygonal, not prismatic cells, and, in some parts of the leaf at any rate, to be as abundant on the lower as on the upper surface of the leaf.—*Gardeners' Chronicle*, June 8.

THE BRIMSTONE BUTTERFLY.

THIS delicate butterfly is, wherever it occurs, one of the most common of British insects ; it is by no means rare upon the Continent, and may be met with in great numbers in some parts of India. Few insects can be more attractive to the eye than this species when upon the wing ; its flight, though rather more rapid and powerful, very much resembles that of the well-known *Pieris Brassicæ*, or common white butterfly of our gardens ; like it, the Brimstone has a habit of repeating the same regular journey over and over again for hours together, therefore, though the collector should miss his insect the first time it passes him, he need not despair of eventually capturing it, if he but remains in the same place for a few minutes. Of this fact we had practical proof the very first time that we saw the insect alive, and in the neighbourhood of London.

The Brimstone is at its prime towards the middle of August. In order to see it to perfection it is necessary to leave the noise and bustle of town, and choosing, if practicable, a clover field in the vicinity of some large wood, we are not long in detecting its golden glories upon the wide-spread purple carpet, for in such spots as these our yellow friend especially delights.

What luxury, whilst scenting the delicious perfume of the clover, to watch those sulphur-coloured fairies fluttering from flower to flower in search of their sweet food !

Having taken our fill at the Brimstone's restaurant, we may enter the wood where we again perceive these butterflies in pursuit of beauty. The charm of the female of this species depends upon its greater delicacy of colouring, the male having the advantage in richness of hue.

The males far exceed the females in number (this seems to be usually the case with common species), and consequently the competition in matrimonial affairs is something dreadful. We have taken seven Brimstone butterflies at one stroke of the net, and six of them proved to be males. The genus *Rhodocera*, to which this species belongs, contains a great variety of beautiful forms, in all of which the prevailing colour is yellow. A figure of this species, showing both sides of the wing, will be found in the "Proceedings of the Zoological Society" for 1865, under the name of *Gonepteryx Urania*. The eggs of the Brimstone butterfly are of a conical form, with ribs sculptured on the sides. The caterpillar, when fully grown, is green, finely speckled with black, and with a pale lateral line; it may be found upon buckthorn (*Rhamnus catharticus*) and alder buckthorn (*R. frangula*). The curiously-shaped chrysalis is suspended by means of a central girdle and a web of fine silk at the extremity of the tail; its colour is bright green varied with yellow.

The only well-known variety of the Brimstone is found in the south of Europe, India, Madeira, &c.; it differs from the common form in having the greater portion of the front wings suffused with orange. It has, however, been described as a distinct species under the name of *Cleopatra*, but the fact of its having been bred from the same batch of eggs with *R. Rhamni* has effectually proved its identity with this common species.

The arrangement of the veins upon the wings of this insect differs considerably from that in the swallow-tailed; the nervules of the front margin (*costa*) of the upper wings being all widely separated, whilst in *Papilio Machaon* they lie close together. Again, the termination of the cell is in this species concave instead of convex, but a careful eye will readily detect these and many other points of distinction between the two insects; so we need not enter into a more detailed description of them here.

The scales are somewhat variable in shape, but not nearly so much so as in the preceding species; this may be partly owing to the uniform colouring of the insect. The legs are short, hairy, and thickly clothed with scales: as in the swallow-tailed, they are all made use of in walking. The antennæ (horns) are flat, and in form something between a cricket-bat and a canoe-paddle; the annulations are not very distinctly marked and are rather wide apart. The proboscis is black and flattened; it coils up very much like a watch-spring, and is protected by a pair of moderately large palpi, which when strongly magnified, form beautiful microscopic objects; they are clothed with long yellow scales, excepting at the upper outer margin, where the scales are short, and of a blue-grey colour, varied with red points.

The caterpillar of *Rhodocera Rhamni* may be found from May to July; the perfect insect leaves the chrysalis during the following month, and may be met with until towards the end of October, when it hybernates, and appears again in February, the females then continuing until May. The males, if taken in the spring, are frequently so much shattered and chafed, that they are utterly useless as specimens for the cabinet, although they may still be of value to cut up for microscopic objects. This beautiful insect is common and generally distributed in the south of England; it is scarce in the midland counties, and does not occur in Scotland.—Arthur G. Butler, F.Z.S., in *Nature and Art*, June.

NESTING OF THE PEREGRINE FALCON.

Mr. H. W. Fielden, writing in the June number of the *Zoologist*, says:—"I wrote to a friend in Stirling, in the beginning of April, to inquire whether the falcons had made their appearance this spring in the hilly districts that lie to the south of the villages of Hippen and Gurgunnock, in Stirlingshire, a locality at least thirty miles in any direction from the sea. In a few days I received a reply, to the effect that he had seen a pair of peregrine falcons sailing around a precipitous mountain-side, from which, in 1857, I had taken a nest. Begging him to watch carefully for the nesting-places, and to get ready a sufficient amount of rope, I waited till the 26th of April, and then went to Stirling. The morning of the 27th saw us at early dawn at the base of the precipice, and I immediately—directed by his barking note—descried the tiercel sailing high overhead: my companion pointed out a spot where he thought he had marked the nest, but, after a severe climb, there was no hole or trace of a nest to be found. Rather disappointed, but still hoping that the female was sitting close somewhere in the rock, I walked along the base of the crag, shouting out, and every now and then striking some rock with my stick: suddenly from behind me the female bird started forth from the rock with a wild cry, and began circling round our heads, apparently in great anger. Not having discovered the exact situation of the nest, we withdrew about a quarter of a mile, and hid ourselves behind a boulder rock, watching every movement of the falcons through a glass: as soon as we were out of sight the female began wheeling around that portion of the cliff where evidently the nest was. The tiercel came down and joined her, both sailing backwards and forwards across the face of the cliff, with a flight not unlike that of swifts. In a quarter of an hour or so the female bird alighted on a small projection of the rock, stretched her pinions to their full extent, then gracefully closed them and commenced preening her wing-feathers: her toilet being arranged she turned round and popped into a small hole behind her in a most undignified manner, bobbing her head and waddling in after the manner of a pigeon entering a dovecote. I felt confident this must be the nest, but walking back again to the base of the rock, struck with my stick, and out she flew, screaming wildly and hovering about thirty feet over my head: the tiercel again joined her, and both of them displayed great indignation at my intrusion, circling round my head and uttering sharp cries, the tiercel, however, always keeping at a far greater distance than the female, which I could have shot with the greatest ease. To get at the nest was a matter of some difficulty: the precipice, a straight up and down slippery trap rock, was at least a hundred and fifty feet high, and the nest about fifty feet from the bottom: our best plan was to let a rope over until it touched the ground, and then with its aid climb up to the nest, but to accomplish this required more rope than we had with us, so we returned to Stirling. Sunday intervened, but the 29th of April saw us out again with an extra hundred feet of rope: letting the rope over, attaching it to a post at the top, constructing a rough ladder to ascend by, took us some hours, and it was six in the evening when my companion got up and took four eggs out of the hole: the eggs were lying on the bare rock, not a bit of material of any kind underneath them: during the time my companion was ascending the rope the female bird made most vicious attempts to strike him, sometimes coming within five or six feet of his head. I must mention what occurred when my companion was within ten feet of the nest: a pair of wild ducks, going to their lowland feeding-ground, came down the glen; the tiercel, as they passed the cliff, dashed off in pursuit, singling out the mallard, who with loud quackings attempted to rise above the hawk; the sight seemed too much for the female falcon; for a few moments she forgot her maternal instincts and joined her partner in the chase; making one dash at the mallard, which he eluded, she returned again to hover over our heads: a thick fog rolling up the glen shut out the tiercel from my view, and I could not see whether he killed his quarry or not, but I expect he did, as the ground at the base of the precipice was strewn here and there with grouse and duck bones and feathers. After withdrawing the rope, the falcon re-entered the hole, and as long as we were there did not leave it, and as it was getting dark I fancy she would remain seated in the nesting-hole till next morning. The eggs were deeply sat on, and gave me some trouble in emptying. These falcons will doubtless raise a second brood, unless some keeper gets his eye on them. I was so interested in their magnificent flight, courage and beauty of plumage and shape that, easily as I could have shot them, I refrained from doing so, hoping that they will hatch their second clutch of eggs and rear their brood in safety.

EXPLORATION OF GREENLAND.

Mr. Edward Whymper, the renowned Alp climber, who has started on his journey to Greenland, sends the following interesting letter to the *Athenæum*, June 15th:—

Copenhagen, 1867.

I shall be landed at the small Danish settlement of Jakobshavn (on the 69th parallel), and that place will be my head-quarters, at which I shall make my depot, and from which my journeys will be made. I have selected this point of departure, because there are greater facilities of communication between it and the other settlements than I could find at other stations, and also because I have reason to believe that the chances of getting into the interior will be greater for a party starting from there, than from any point in the neighbourhood.

I intend to travel by means of dog sledges, but I expect considerable trouble in getting them over the rough country which intervenes between the coast and the inferior snow. The latter, when once reached, I expect will prove comparatively easy travelling.

My system of travelling will be to do without depots *en route*, carrying as little weight and moving as rapidly as possible. In the first instance some time will be spent in preliminary trials and reconnoitering, and I shall then start for a month or five weeks' journey, taking at first a north-easterly direction, then coming south, and returning due west. I shall, if this journey is not entirely unsuccessful, then go for a similar amount of time to the south-east, returning to Jakobshavn by a more northerly route. The remaining time, if any, will be spent in exploring the island of Disce, and in examination of the fossil remains which are found in the neighbourhood, particularly on the shores of the Waigat Strait. I expect to leave for England in September, and to be home by the end of October or early in November.

The interior of Greenland is at present entirely unknown, and no serious attempt has ever been made to explore it. The two or three excursions which have been made by Danes towards the interior during the present century have experienced no greater difficulties than might be expected from inadequate time and imperfect means. Dr. Hayes (U.S.) has, however, on more than one occasion, made excursions towards the interior with considerable success, and has managed to travel occasionally as much as thirty-five or forty miles in a day. There is no reason to suppose that the interior presents extraordinary difficulties for travelling, and there is good reason to believe that it is something better than a dreary waste of ice and snow. Not only are traditions to be met with on every hand among the Greenlanders that the interior is a fertile country, but it is made almost a certainty by the fact that the countless herds of reindeer which occasionally visit different parts of the coast always retire towards the interior, where they are not followed. These herds of reindeer are so vast in numbers that they must require for sustenance a considerable amount of food; and hence it is believed by many who are best acquainted with the subject that the interior, if not a fertile, must be very far from a barren, country.

The unconquerable aversion of the natives to travel over the snow has proved hitherto the greatest difficulty in the way of visiting the interior. They have traditions of a savage, cannibal people living on the other side of the range of mountains which bounds the view from Davis's Strait; and others of a ferocious wild beast, the "Amarok," which has never, however, been known to be seen, much less taken. But the largest part of their aversion to travel over the snow is derived from their fear of the crevasses which it covers and conceals, and into which they have oftentimes fallen. I shall probably get no assistance from the Greenlanders, but I reckon on some from the half-breeds.

I cannot close this letter without a recognition of the kindness I have received at the hands of the Danes. Great and unexpected as the assistance has been which I have received in England, I must say that it has been surpassed by that which I have received from total strangers, who have not and who cannot receive any return.

LEAF PARASITES.

A letter has just been received from Professor Passerini, in which he alludes to two leaf parasites which have lately been observed in Italy. Of the first he says—"It may perhaps interest you to know that I have lately published and described, under the name of Uromyces Amygdali, in 'Erbario crittogamico Italiano,' No. 1373, a new fungus which has been gathered on peach leaves at Lago Maggiore; and in the fasciculus of that work just published I have given specimens and a description of another new fungus, which has been named Zythia Rabiei, from its being found on cicer arietinum (the chick pea) when attacked by rabbia, a disease which causes great injury in our fields to the crops of that plant. Though I have long been acquainted with the disease, I have not hitherto been able to detect the immediate cause, which perhaps is not dependent on the zythia, though it seems at least to be a constant attendant on the malady."

We touched on a similar subject in this journal (Nov. 26, 1864) on receiving some diseased peach leaves from an unknown correspondent, "W. W." These peach leaves were attacked by a little fungus, puccinia pruni, which in an early stage of growth is lecythea pruni spinosæ of Léveillé. We had, however, previously received from different parts of the world a distinct though nearly allied parasite on peach leaves, of which also we gave a figure. We have specimens of this from Madeira, sent by Mr. Salwey; from South Carolina, by Dr. Curtis; from Port Louis, Mauritius, by the late Dr. Ayres; from Valparaiso, by Mr. Bridges; and on apricot leaves from Marseilles, by Monsieur Castagne—so that it has a very wide geographical range; and like puccinia pruni, which occurs on apricot and peach leaves occasionally, as well as on those of the plum, seems to travel wherever the tree which produces it is carried. It becomes, therefore, a matter of some interest to ascertain exactly what Signor Passerini's parasite is, and we hope, therefore, to obtain specimens of that as well as of the zythia.

It is curious to see several of our leaf parasites so widely distributed. Both smut and wheat mildew occur wherever our common cereals are cultivated, and seem quite indifferent to climate. We are prepared to meet with the same species of fungi in similar climates, but scarcely in such different localities as Northern Europe and the hot plains of India. We might perhaps attribute this to the extreme simplicity of their organisation, which enables them to adapt themselves to very diverse conditions, were it not for the fact that some plants, as the common hollyhock, which are free from parasites here, are martyrs to them in other countries.—*M. J. B.—In Gardeners' Chronicle, May 25th.*

New Books.

[*Our limited space must of necessity compel us to give but very short notices of new books, but they will perhaps serve as a guide as to what books our readers may ask for at their libraries.*]

The Poultry Book, comprising the Breeding, Management, and Characteristics of Profitable and Ornamental Poultry. By W. B. Tegetmeier, *F.Z.S.* Routledge and Sons, The Broadway, Ludgate.

Although the mania for poultry has somewhat subsided, most persons with the smallest pretence for a yard have the fit come over them and think it would be so nice just to keep a few fowls. Unfortunately, want of knowledge, or want of proper attention to cleanliness, often compels the amateur to give up the attempt at some loss. The rule generally is to procure your stock and gather your knowledge with as little trouble as possible afterwards. If many would only study the various breeds and their qualification first there would not be nearly so many failures. For those who care to do this the present volume is published, and will be found to contain every possible information both as to keeping poultry for eggs and the table and breeding for show. We fear even with this knowledge there are few who will supplement it with a little careful thought, and recollect that fowls like children are the nicer the cleaner they are kept. There is practically no reason why fowls should not be kept in small spaces, but it is essential that they should be *kept clean.* Very few who keep pet canaries or other birds would think of letting their cages remain in a state of filth for weeks, yet many of these same persons would let their fowl-houses and runs go for months, until in fact they become such a nuisance that they must be done away with. As they are cleanly with their small birds, so should they be with their fowls; whatever space they occupy should be looked upon as a large cage and kept clean and wholesome. If this was properly attended to, we are convinced that every house with its few feet of yard might keep a few fowls. For those who live in the country there is positively no excuse; for where fowls can procure fresh air, fresh grass, and fresh ground they are naturally strong and healthy, and require very little looking after.

The volume before us is certainly most handsome, with beautiful illustrations printed in colours, and bound in crimson and gold; it looks like a book got up solely for the purpose of laying on the table to be admired; yet the contents are valuable and practical. Each variety of breed is described by its most successful cultivator, and this gives us such names as Hewitt, Teebay, Douglas, Zushorst, Jones, Horner, Ballance, and Brook as contributors to the volume. A careful study of such a book as this is absolutely necessary to those who intend keeping fowls in confinement, as there are many sorts that will not bear it at all, as Hamburghs, Dorkings, and Game Fowls. Cochins and Brahmas, on the contrary, are equally content in confinement and at liberty. Honduras are hardy birds, but intolerant of confinement, while Polish, Spanish, and Creve Cœurs are amongst the less hardy. The Polish cannot endure damp, and rot under it like sheep; Spanish are very fragile; and Creve Cœurs subject to roup, gapes, and throat affections.

In conclusion, we would suggest those who wish to keep fowls to commence with Brahmas, about which we extract the following :—

Respecting the Brahmas as profitable fowls Mr.

Teebay has favoured us with the following communication: "There is no variety so suitable for a wet, cold situation as this; they even appear to enjoy being out in a drizzling rain searching for insect food round the edge of any small piece of water they meet with. If they have an unlimited range they are great ramblers, remaining out later at night than any other variety that may be in the same run; they are good layers, especially during the cold winter months; they, however, do not want to set so often as the Cochins, and are far more easily cured of their broodiness. When allowed to hatch they cannot be surpassed as mothers, no fowls being more careful not to step on their children, brooding them better, or searching more diligently for insects for their food.

"Brahmas are good table-fowls, the pullets being remarkably full of white meat on the breast, and they lay on flesh very quickly when put up to fatten. The chickens grow with great rapidity, and are very easily reared. I have weighed a cockrel at seven months and two weeks old that weighed 10 lbs. 4 oz., and have seen several cocks under two years old that weighed 15 lbs. each. At four or five years old these large cocks become so heavy that they are generally to be seen resting on their hocks or lying sideways upon the ground, although at the same time in the best possible health; if in this state they are supplied liberally with soft food they will gain weight very fast, and make enormous birds. The average weight of the pullets at five months old is 7 lbs. I may remark that weight is not a good criterion as to the size of Brahmas; for if taken from an open run and confined in a very small place, and liberally fed, they lay on flesh so fast that they will occasionally add from one-fourth to one-third of their weight in three weeks. There is no variety of domestic fowls that breed more true to colour than the two kinds of Brahmas, if they are kept distinct; but should there be the slightest intermixture of the two varieties in the birds that are bred from, few of the pullets will be fit for exhibition, and there will be but seldom two alike in colour or markings in the same blood."

A Fern Book for Everybody, Containing all the British Ferns, with the Foreign Species suitable for a Fernery, By M. C. Cooke. London: Frederick Warne and Co.

It is surely a healthy sign of the times when we find our children taking a delight in the study of animal and vegetable life, and thereby not only amusing and instructing themselves, but also causing our older heads to become interested in subjects that not many years ago were confined only to scientific professors. And how delightful to find these self-same professors whom we had been in the habit of looking upon as persons to be kept at a distance, who, as we thought, could only talk barbarous words in an unknown tongue, and who we consequently avoided as mortals beyond our ken—how delightful to find these men condescending to write and lecture to us and for us in a plain and simple manner. How pleasant to find men who have spent half a life perhaps in the study of one particular subject taking pains to make such a subject popular, and so that we can comprehend and appreciate. Scientific men in these days can see how useful they may become to mankind at large, and do not shut themselves up with all the mystery of alchymists of old. And we are beginning to see the results. The aquarium, the fern-case, and the microscope are taking the place of tops, marbles, and Skelt's halfpenny sheets of characters amongst our children, while we have found new and cheerful amusements for our leisure hours.

Few of us but think we should like to have an aquarium. We get one, but through want of patience or something else we are not successful. Our fishes die, our green stuff will not do as it ought; big beetles eat up little beetles, and large fish as well, and then having nothing else commence upon each other; and our water will smell very nasty. What shall we do with it? It stands for some time empty and useless, and eventually gets smashed; or some one walks in and suggests a fernery. This is not the case with all. Some have patience—some do persevere until they find out wherein they have failed; but many do not, and hail with pleasure the idea that they can turn their monster bell glass upside down and convert it into a miniature fairy land, and that with very little trouble or expense.

For such persons as these, and all others who take a fancy to fern-growing, this little volume is written. It is simple and popular, and is emphatically a "Fern Book for Everybody." In it all the British species are described and figured, and such foreign species as are likely to come under the fern-grower's notice. It would be impossible to have the subject treated in a more pleasant manner, while the well-known name of the author is sufficient guarantee of its accuracy. It is illustrated with plates, each plate depicting two or more varieties. It forms a companion volume to "Common Shells of the Sea Shore and Common Sea Weeds," and is published at one shilling. What more need we say? The price, quantity, and quality are its best recommendations, and indeed will do more to insure its success than anything else.

A Handy Book of Meteorology. By Alexander Buchan, M.A., Secretary of the Scottish Meteorological Society. 12mo. Pp. 204. William Blackwood and Sons.

This handy little volume gives a short history of meteorology. Beginning with a sketch of its history and scope, the author in different chapters treats of the pressure of the atmosphere, its temperature, solar and terrestrial radiation, distribution of temperature, moisture, &c. It is clearly arranged in paragraphs under separate headings.

The instruments used are described and figured, and woodcuts interspersed where necessary, together with five charts. It is by no means dry, notwithstanding the show of dates, measurements, and tables. The observations on storms are very interesting, as is also the description of the various kinds of clouds. Those of our readers who desire a handy book of meteorology cannot do better than procure this little work. As a specimen, we select the following extract on—

Increase of Temperature with Height in Cold Weather.—"This takes place invariably in dry, calm, clear weather during the night, and in winter, when the temperature of the air falls by contact with the chilled surface of the earth (Proofs from the observations of Mr. Glaisher and Mr. Ch. Martins). But the rate at which the temperature rises with the height is modified to a very great extent by the physical configuration of the surface—that is, whether that surface be level, undulating, or mountainous. Suppose an extent of country, diversified by plains, valleys, hills, and table lands, to be in circumstances favourable to radiation, and each part under the same meteorological conditions, except in the single point of position, radiation will proceed over the whole at the same rate, but the effects of radiation will not be felt everywhere in the same degree and intensity. For as the air in contact with the declivities of the hills and rising grounds becomes cooled by contact with the cold surface of the ground, it acquires greater density and weight, and consequently slips down the slopes, and accumulates in the plains below. Hence places situated on rising grounds are never exposed to the full intensity of frosts; and the higher they are relatively to the surrounding ground, the less are they exposed, because they are protected by their elevation providing, as it were, an escape for the cold almost as fast as it is produced. On the contrary, valleys more or less environed by hills or eminences, not only retain their own cold of radiation, but also serve as reservoirs for the cold of neighbouring heights. Hence low-lying places are peculiarly exposed to intense cold. Plains and table lands are similarly affected by their own radiation. This explains why vapour becomes visible so frequently in low places, whilst adjoining eminences are clear; and the same fact instinct has made known to cattle and sheep, which generally prefer to rest during nights on knolls and other eminences. Along most of the watercourses of Great Britain, during the memorable frost of Christmas, 1860, Laurels, Araucarias, and other trees growing below a certain height, were destroyed, but above that height they escaped, thus attesting by unmistakeable proof the great and rapid increase of the temperature with the height above the lower parts of the valleys.

The Edible Mollusks of Great Britain and Ireland. By M. S. Lovell. 8vo, pp. 208. 9s. London: Reeve and Co.

Mr. Lovell deserves many thanks for endeavouring to make popular in the present volume a class of food that has hitherto been lamentably neglected. On our coasts are to be found many edible species of mollusks with which an acquaintance may be made with advantage. Mr. Lovell is here kind enough to introduce us to all the species found in Great Britain, not only marine, but air-breathing. The volume is very readable, as well as valuable in a gastronomic sense, giving the history and employment of the different species, which is followed by directions for cooking and preparing for human food. There are many coloured illustrations which serve to impress them with certainty upon the reader's mind.

The Silkworm Book; or, Silkworms Ancient and Modern, their Food and Mode of Management. By W. B. Lord, R.A., Author of "Sea Fish, and How to Catch Them," &c. Demy 8vo., price 2s. 6d., cloth gilt. London: Horace Cox.

This work treats of all the known kinds of silk-producing worms, the food that should be given them, and the way they should be managed. It is well illustrated with engravings of the caterpillar, moth, and cocoon of the Oak-leaf Silkworm (the Yama Mai), the Ailanthus, &c.; and illustrations descriptive of the apparatus, &c., used in the management of the worms, and the preparations and winding off of the silk from the cocoons.

BOOKS RECENTLY PUBLISHED.

On the Management and Preservation of Game and Ornamental Birds, and the Laws Relating Thereto. With numerous Illustrations. Price 1s. 6d. London: Bemrose.

The Apiary, or Bees, Bee-hives, and Bee Culture. With numerous Illustrations. By Alfred Neighbour. Price 5s. Geo. Neighbour, and Sons, 149, Regent-street, 127, High Holborn.

The Salmon: Its History, Position, and Prospects. By Alex. Russel, Editor of the *Scotsman.* 1 vol. demy 8vo., 7s. 6d. Edmonston and Douglas, 88, Princess-street, Edinburgh.

An Angler's Rambles, and Angling Songs. By Thos. Tod Stoddart, 1 vol. 8vo., price 9s. Edmondston and Douglas, 88, Princess-street, Edinburgh.

Meetings of Learned Societies.

ETHNOLOGICAL SOCIETY.

At the meeting of this society, held May 21st, J. Crawfurd, Esq., president, in the chair, the Report of the Council and of the Treasurer were read. The number of new members during the past year was greater, and the balance at the bankers larger, than on any previous occasion. The following officers and council were elected for the ensuing year:—*President,* J. Crawfurd, Esq.; *Vice-Presidents,* R. Dunn, Esq., Sir J. Lubbock, Bart., Prof. Busk, and General Balfour;

Hon. Treasurer, F. Hindmarsh, Esq.; *Hon. Secretaries*, T. Wright, Esq., and D. W. Nash, Esq.; *Hon. Librarian*, L. J. Beale, Esq.; *Council*, Lord Milton, W. Blackmore, H. G. Bohn, Dr. A. Campbell, T. F. D. Croker, Sir W. A. Clavering, Bart., J. Dickinson, Sir J. Shiel, Dr. H. Tuke, Dr. Beddoe, Sir M. Wells, Rev. F. W. Farrar, Prof. Huxley, J. Mayer, Sir R. I. Murchison, Bart., Sir C. Nicholson, Bart., Sir E. Ryan, Lord Strangford, J. Thrupp, and Sir J. Davis, Bart. A special vote of thanks to the President for his zealous and valuable services to the society, both in respect to the active management and the able and numerous papers contributed to its evening meetings, exhibiting, as they have done, the most mature deliberation and extended research and experience, was appropriately and deservedly proposed by General Balfour, and carried by an acclamation and accord significant of the heartiest personal attachment of the fellows to their veteran chief.

Entomological Society.

At the meeting May 6th, Prof. Westwood, V.P., in the chair. Mr. J. Sidebotham was elected a member, and M. S. C. Snellen van Vollenhoven, of Leyden, corresponding member.—Mr. S. Stevens exhibited a number of Coleoptera from the Cape York district.—Mr. Stainton exhibited larva-cases of *Coleophora lixella*, which when young was found to feed on thyme, but afterwards transferred itself to a species of grass; also the larva of *Hyponomeuta egregiella*, found at Fontainebleau on *Erica cinerea*.—Professor Westwood had recently received some Cimicidæ (*Enicocephalus Tasmanicus*) which possessed a pleasant musk-like scent, which communicated itself to the letter in which the insects had been forwarded.—The Secretary read a letter from Mr. R. W. Fereday, corresponding member in New Zealand, in which he says: "I have much satisfaction in communicating to the society the capture of a specimen of Cynthia Cardui, in the province of Canterbury, on the 5th of January last. The plains of Canterbury are separated from the west coast of the island by a range of mountains, one of these is named Mount Torlesse, and is about 6,000 feet above the level of the sea; immediately adjoining are some lower hills, and it was at the summit of one of these, about 3,000 feet above the sea, that I met with this butterfly, and made the capture. It was flying about and settling on a piece of rock, the herbage up to the top of the hill being tolerably luxuriant amongst the stones. It is the only specimen I have seen, and have not heard of any one else having seen one in this colony. It is so precisely like my English specimens in size, colour, and markings, with one exception, that I entertain no doubt of the identity of the species. I attribute the exception to a local variation; it is with respect to the round spots on the hind wings, which in my British specimens have no distinct centres, whilst in this specimen ocelli take the place of mere spots; it is, as it were, a spot of bright light blue, the same colour as the small blue marks at the anal angle of the hind wings, introduced into the centres of the normal spots of the English specimens. I enclose a photograph of it. I do not recollect whether any of the British examples have the blue centres to the spots. If the insect is Cynthia Cardui, of which I do not entertain a doubt, this capture is important, as it will add the link which will complete the circuit of the globe in the range of this species." A letter was also read from Mr. C. A. Wilson, corresponding member at Adelaide, in which the writer gave an account of a centipede having been killed by the excessive heat of December last in Cockatoo Valley, and announced the discovery on the Gawler River of a stylops, the first time that a strepsipterous insect had been detected in Australia.—Mr. F. Smith added some further information respecting this stylops, and exhibited specimens of the wasp, *Paragia decipiens*, upon which it is a parasite.—Mr. Bates read a paper "On a Collection of Butterflies formed by Thomas Bell, Esq., in the interior of the Province of Maranham, Brazil."

On June 3rd, Sir John Lubbock, Bart., president, in the chair.—Mr. Pascoe exhibited a collection of Coleoptera from Graham's Town.—Mr. T. W. Wood exhibited specimens from British Columbia of a Vanessa allied to *V. Urticæ*.—Mr. Stainton exhibited the larva, pupa and imago of *Earias siliquana*, a moth which was described as having almost destroyed the cotton-crops in both Upper and Lower Egypt; the larva eating into the ovary of the flower, and changing to a pupa in the cotton-ball.—Mr. Bond exhibited a Tortrix, captured by Mr. Meek at Darenth Wood, and believed to be new to this country.—Mr. F. Smith exhibited a razor-case, in an empty compartment of which, entered through a hole at the bottom, the wasp *Odynerus quadratus* had constructed its nest, from which Mr. Smith had bred ten male and four female wasps.—The President exhibited *Epidapus venaticus*, found in Kent, under bark.—Several instances were mentioned, in which, after the heavy rain of the previous night, numerous specimens of Gordius were observed. Mr. S. Stevens had noticed them at Kennington, on the ground, and a nephew of his, at Ashford, on rose-bushes; Mr. Weir, at Brixton, and Mr. Broad, near Regent's Park, also on bushes.

Zoological Society.

At a meeting of the above Society of London, held at Burlington House, on Thursday, May 23rd, Dr. J. E. Gay, vice-president, in the chair, Mr. E. Blyth exhibited some tracings and photographs of horns of different Indo-Chinese deer, also two fine specimens of *Corvus*, from Australia.—Mr. E. P. Ramsay, of Sydney, New South Wales, communicated a note "On the nesting of the Australian Stilt-plover" (*Himantopus leucocephalus*) as observed by himself in the neighbourhood of Grafton, N.S.W.—Messrs. P. L. Sclater and O. Salvin read a paper on the birds collected by Mr. Wallace on the Lower Amazon and Rio Negro. The total number of species collected by Mr. Wallace in the neighbourhood of Para was stated to have been 240, three of which appeared to be new to science. The chief result arrived at from the examination of this collection was, that the district of Para, as regards its birds, belongs strictly to the same province as Guiana, and is broadly distinguishable from the wood region of South-Eastern Brazil. Another paper was also read by the same gentleman on some new American pigeons of the genus *Leptoptila*.—Dr. Murie read a paper on the osteology of the wombats.

—Dr. J. E. Gray communicated two papers, one on a new species or variety of lemur, in the Society's gardens, the other on the variegated or yellow-tailed rats of Austral Asia.—Dr. Edwards Crisp read a paper on certain points in the anatomy of the hippopotamus, and exhibited some casts and drawings of the same.—Mr. F. Moore read a paper on the lepidopterous insects of Bengal, being the third and final part of a memoir upon this subject.

ROYAL HORTICULTURAL SOCIETY.

May 21st, W. Wilson Saunders, Esq., in the chair. —After the election of 17 Fellows, and the affiliation of the Wolverhampton Horticultural Society, the Rev. M. J. Berkeley remarked, that as the meeting was chiefly devoted to tricolour-leaved Pelargoniums, he would call attention to the principles on which their colouring depended. The original species from which they were all derived was the old Cape species Pelargonium zonal, of which he produced a specimen, in which the leaves were only slightly zoned. The first improvement on this was Fothergillii, which was a seedling, from which all the improved varieties around him had emanated. Variegation, he said, was really a disease; and in the vegetable kingdom everything abnormal in structure may be considered as the result of disease. Kohl Rabi, the useful portion of which results from an overgrowth of the stems, Radishes, &c., were cited as illustrations of this fact, even blanching was stated to be a species of disease, as was also the variation in Tulips and other matters of that description. Diagrams showing the structure of the leaf of one of the best showy zoned Pelargoniums were then exhibited. Beautiful, he said, as were the plants exhibited, it might, however, safely be concluded that perfection in regard to these Pelargoniums had not yet been attained; and in illustration of this he exhibited the drawing of a leaf, in which occurred distinct zones of yellow, red, and green, without radiation, which he said it has been proposed by Mr. Moore should in future form a criterion by which the merits of these plants should be judged.

The Rev. Joshua Dix congratulated the meeting on the success of the Exhibition, the idea of holding which had first originated with Major Trevor Clarke. —Major Trevor Clarke said, that when he had put together a few notes on the general phenomena of variegation in plants, he was not aware that the subject would be taken up by Mr. Berkeley; but as his own views were different from those of the reverend gentleman, he would state them. Mr. Grieve, gr. at Culford Hall, near Bury St. Edmund's, was introduced by Major Clarke, and to whose indefatigable industry we owe the first and best of the fine forms of tricoloured Pelargoniums which now grace our gardens, who then read a very interesting paper.

At the Meeting held June 18th, Sir R. Murchison, Bart., in the chair. After the election of five new members and the affiliation of three societies, the awards of the Floral and Fruit Committees were announced, and Mr. Shortt, gr. to Lord Eversley, at Heckfield, was called upon to offer a few remarks in reference to two fruits of what was called Passiflora macrocarpa, which he exhibited.

The Rev. M. J. Berkeley, in his remarks on some of the plants exhibited, first directed attention to Gordonia javanica, which belongs to the same natural order as the Tea plant. Gordonias, he said, are bog plants, the bark of which is used in North America for the purposes of tanning.

Mr. Bateman said, that though all knew the splendid specimens of orchids which Mr. Anderson, Mr. Dawson's gardener at Meadow Bank, was in the habit of exhibiting from time to time, yet he had never sent finer than those which he exhibited on this occasion. Beautiful as was his bunch of Odontoglossum Pescatorei, it only represented a fraction of the blossom on the plant from which it was cut, and on which no less than 300 flowers were counted. Coming to the immediate subject of his lecture, Lælia majalis or Flor de Maio, it was, he said, one of the few orchids which was fortunate in having a history as well as a name—in fact, many names, the native one being Itzumaqua; besides which it had two or three Spanish, and three or four Latin names. He approached, and not without perplexity, the subject of the treatment best adapted for this beautiful Lælia, the more so as it perhaps ought to be considered typical of the proper *régime* in what was called the "Mexican," as contradistinguished from the Peruvian and other cool houses.

The chairman, in returning Mr. Bateman the thanks of the meeting for his interesting lecture, said that though a fossil orchid had never yet been discovered, he would endeavour to stimulate geologists to search after such, and did not despair of finding such a thing when the geology of the countries where orchids now most abound was thoroughly investigated.

GEOGRAPHICAL SOCIETY.

May 27th.—Anniversary Meeting.—Sir R. I. Murchison, Bart., in the chair.—The Report of the Council showed that during the year 147 Fellows had been elected; 19 paid life compositions; and 45 Fellows, neglecting to pay subscriptions for three years, had been struck out of the list. The excess of income over expenditure was £1,032 13s. 3d., £1,000 being added to the funded property. The library received during the year 1,068 volumes of books and pamphlets, and the librarian had, since his appointment, arranged the various works according to their subjects as far as possible, and had also made some progress in a systematic catalogue of subjects and authors. The map-room had also received 2,426 additional maps and charts, some being of the greatest value and interest. A sum of £200 was devoted to the Leichardt search fund; a further sum of £50 to promote the search for M. G. Rohlfs, last heard of at Lake Tshad; a set of instruments for Mr. Whymper, for his exploration of Greenland; and also a set for Mr. H. Whitely, who is at present on the eastern slopes of the Andes in Southern Peru.—This year the royal medals for the encouragement of geographical discovery were awarded to the Russian Admiral Boutakoff, who launched a steamer on the Sea of Aral and established steam communication between that sea, through the river Jaxartes, with Central Turkestan; by this means land communication is established between China and St. Petersburg. Captain Crown, Russian Navy, in accepting the gold medal of the founder on the part of his friend, stated that Russian works hitherto published in that difficult language would be for the future issued in a form more accessible to English readers. The Victoria medal was handed to the American minister to be forwarded to Dr. Kane's fellow-traveller in the far north, and Dr. J. J. Hayes adds this fresh acknowledgment of the world's esteem for his courage, endurance, and fortitude in penetrating further north than any civilised man, as may be readily seen by reference to Peterman's recent comparative maps, showing in one sheet the work of Batfin, 1616, Ross, 1818, Englefield, 1852, Kane, 1855, and our hero, 1861. "The Open Polar Sea" will be a favourite work for many years to come, and in accepting the reward Mr. Adams said the discovery of his own country by Columbus was due to the same spirit of enterprise which stimulated his countryman; how often, he remarked, was the reward for the endeavour greater than the value of the object sought; and he was happy to state that in his country enterprise was applauded and emulated when our efforts were being made with the same hearty good fellowship, he was proud to see actuated ourselves. The United States still see that Arctic expeditions are worthy the attention of even that sensible nation, and it is a pity that an enterprise so long prosecuted by Englishmen is likely to have its last chapter written by American hands, after nearly three centuries have been spent by us in this noblest field of scientific research.

The President then gave his address, and in the evening the Fellows dined at Willis's Rooms.—The following officers were elected:—*President*, Sir R. I. Murchison, Bart.; *Vice-Presidents*, Vice-Admiral Sir G. Back, F. Galton, Esq., Major-Gen. Sir H. C. Rawlinson, and Major-Gen. Sir A. Scott Waugh; *Trustees*, Lord Houghton and Sir W. C. Trevelyan, Bart.; *Secretaries*, C. R. Markham, Esq., and R. H. Major, Esq.; *Foreign Secretary*, C. C. Graham, Esq.; *Councillors*, Hon. H. U. Addington, J. Arrowsmith, Major-Gen. G. Balfour, Sir S. W. Baker, T. H. Brooking, J. Crawfurd, Right Hon. Lord Dufferin, Commodore A. P. Eardley Wilmot, J. Fergusson, A. G. Findlay, Right Hon. Sir T. F. Fremantle, Bart., W. J. Hamilton, Capt. F. Jones, Sir W. S. Maxwell, Bart., H. Merivale, Sir C. Nicholson, Bart; L. Oliphant, Capt. S. Osborn, Capt. G. H. Richards, Viscount Strangford and T. Thomson; *Treasurer*, R. T. Cocks, Esq.

At a meeting, June 3rd, Sir Roderick Murchison, K.C.B., in the chair. The following new Fellows were elected: H. A. Glass, E. T. Higgins, J. Johnson, R. Eadie, A. Seymour, M.P., and J. E. Wilkins, H.M. Consul Chicago. A paper was read by Mr. G. A. Findlay, "On the last Journey of Livingstone in relation to the Sources of the Nile;" the careful, elaborate, and exhaustive investigation of the accounts of every previous explorer of the great lakes of central Africa, given by the learned author of the paper was listened to with marked attention, and the number of charts and diagrams exhibited afforded the audience every facility in following the narrative. Dr. Kirk's opinion was that Livingstone had settled the northern termination of Lake Nyassa, and that any streams met with beyond flowing to north-west were tributaries of Lake Tanganyika, and this lake in all probability communicated with the Albert lake and the Nile. This opinion, strengthened by the harmony in the known levels of these waters, confirmed the deductions arrived at by the author. Mr. Petherick expressed his entire disbelief in the reported death of the illustrious traveller; Mr. Baines, Mr. Waller, and the President also expressed their hopes for his safety.

Mr. Young and his companions, who left London on Thursday for Southampton, to solve this grave doubt as to the fate of Livingstone, were present at the meeting. A beautifully bound volume of photographs of Fellows, presented by Maull and Company, has been added to the library of the Society.

GEOLOGICAL SOCIETY.

The following papers were read at the ordinary general meeting of this Society on the 22nd inst., J. Carrick Moore, Esq., M.A., F.R.S., Vice-President, in the chair:—

1. "On the Bone-caves near Crendi, Zebbug, and Melheha, in the Island of Malta." By Captain T. A. B. Spratt, R.N., C.B., F.R.S., F.G.S. The Crendi (or Mahlek) Cavern is situated on the south coast of Malta. The flooring consisted of two distinct deposits, the lower being a stratum composed of a hard stalagmitic clay with rounded pebbles, and containing teeth and bones (unworn) of the hippopotamus (H. Pentlandi). The upper stratum, also a stalagmitic deposit, contained bones of the *Myoxus Melitensis*, and of birds, with some recent land shells. The Zebbug cavern, in the interior of the island, was, when discovered, filled with sandy clay containing subangular fragments of the rock, and bones of at least two species of elephant, comprising a complete set of the teeth and tusks of the pigmy elephant, representing animals in every stage of growth, and part of the tusk of a much larger elephant. No remains of hippopotamus were met with in this cavern; but a few bones of *Myoxus* (2 sp.), of birds, and of a chelonian, were discovered in it. The Melheha Cavern, at the north end of the island, contained a deposit with remains of the teeth and bones of the hippopotamus only, and seemed therefore to represent the lower stratum of the Crendi Cavern. From the fact that the deposits containing remains of the hippopotamus were so distinct from those including the elephant remains, Captain Spratt inferred that these two mammals belonged to distinct geological epochs, the elephant being the more recent. As Malta and Gozo were probably elevated above the sea at the close of the Miocene period, it is very possible that the caverns, formed by the long action of the sea upon its cliffs, may contain the relics of animals of more than one, if not of each, subsequent geological period.

2. "On the Lower Lias of the North-east of Ireland." By Ralph Tate, Esq., A.L.S., F.G.S. The author described the Lias of Ireland as consisting of (1) the Avicula-contorta series, including a well-developed zone of *Avicula contorta* and the White Lias; (2) the lower Lias, embracing the equivalents to the zones of *Ammonites planorbis*, *A. angulatus*, and *A. Bucklandi* of Great Britain; and a fourth zone (that of *Belemnites acutus*), representing that portion of the Lower Lias superior to the zone of *Ammonites Bucklandi*. Mr. Tate stated that the principal portion of

the Lias belongs to the zone of *Avicula contorta*, and that the greater portion of the Lower Lias is comprised in the zone of *Ammonites angulatus*. The remarkable and isolated mass of metamorphosed Lias at Portrush was referred to the "Planorbis series."

3. "On the Fossiliferous Development of the Zone of *Ammonites angulatus* in Great Britain." By Ralph Tate, Esq., A.L.S., F.G.S. In this paper the author recorded the discovery of a fauna, hitherto imperfectly known in this country, characterising beds below the Limestone-series of the Lower Lias. It is exceedingly rich in fossils. Cephalopoda are few in number (about eight species); Casteropoda are very numerous and characteristic, there being about fifty species, the majority of which are new to Great Britain; the Corals are abundant and peculiar. *Ammonites angulatus* was stated to occur at various places in Ireland; at Marton, Lincolnshire; in Warwickshire; in North Gloucestershire; at Brocastle and Sutton, in Glamorganshire; and in Dorsetshire.

4. "On the Rhætic Beds near Gainsborough." By F. M. Burton, Esq., F.G.S. Beds of the Rhætic series were stated to occur at Lea, two miles to the south of Gainsborough, and were described as consisting of more or less indurated and highly micaceous sandstones, alternating with black shaly clays, and containing two bone-beds. The fossils are very abundant, and are those which are usually met with in the *Avicula contorta* zone of other parts of Great Britain. However, the right *ramus* of the lower jaw of an *Icthyosaurus* was found in the lowest bed, lying on the blue Keuper Marl. Two interesting additions to the vertebrate fauna of this series are *Trematosaurus Alberti*, and *Lepidotus Giebeli*. The author pointed out the correlation of these beds with those at Aust Cliff and other well-known localities in England, and their probable connection with similar deposits in Ireland and on the Continent; and he concluded by defining the surface-extent of this the most northern English deposit of Rhætic age as yet discovered.

On June 5th, W. W. Smyth, Esq., in the chair. The following addition to the bye-laws was proposed by Mr. S. R. Pattison, seconded by Mr. J. W. Flower, and adopted by ballot, with one dissentient: "Section XIX. 5. The Society shall not and may not make any dividend, gift, division, or bonus in money, unto or between any of its members."—Mr. A. W. Franks was elected a Fellow.—The following communications were read: "The Alps and the Himalayas, a geological comparison," by Mr. H. B. Medlicott. The views of the author did not coincide with those expressed by Sir Roderick Murchison, Sir Charles Lyell, or Professor Ramsay, and at the conclusion of the paper, Sir Roderick, Sir Charles, and Professor Ramsay spoke to the subjects to which their attention was particularly drawn. Sir Charles spoke at great length in support of his views of the depression, upheaval, and contortion of the Alpine range, and explained the actual condition of the fresh water, brackish, and sea deposits in the locality, he did not agree with the writer, and was under the impression that the writer had misunderstood him. Sir Roderick, whose writings and observations on the Alpine and Jura range had been long since generally accepted, was at a loss to understand the system of the writer, and still held to his opinion. While he expressed his admiration of the industry bestowed on the paper he refrained from going into the subjects treated of, as he believed they each were worthy of separate discussion, and Professor Ramsay having by means of a rapidly sketched diagram elucidated the accepted theory of the structure and condition of the Righi, and the position and direction of the various beds composing the elevated portion of the district and accounted for the position of the strata, avoided touching upon the other theories advanced. Mr. Blanford, lately returned from India, explained the views held by his friend Mr. Medlicott, whose labours in the Himalaya were worthy of perfect confidence, as he had devoted many years to the study of their geologic structure; he feared the scope of Mr. Medlicott's paper, owing to an abstract of it only having been laid before the society, would fail to be appreciated by the members at its full value. In recent volumes of the society's transactions the details of Himalaya geology were recorded by the author, and his object in instituting a comparison with the Alpine range in Europe, was simply because he thought he saw in a recent visit to the Alps, a sufficient similarity of structure to justify him in laying the two subjects side by side for comparison by those who had only opportunity to visit the European range.

Mr. Woodward, alluding to a passage in the paper, in which it was stated that the vaults in the British Museum contained the Indian geological specimens, stated that his late brother had carefully set out in the Museum the collection from the Himalaya range, and the valuable series added to by the many contributors, whose names he mentioned, were accessible at all imes.t—"On some striking Instances of the Terminal Curvature of Slaty Laminæ in West Somerset," by Mr. D. Mackintosh.

ROYAL MICROSCOPICAL SOCIETY.

The meeting of this society on the 12th instant (Dr Arthur Farre, F.R.S., Vice-President, in the chair was the best as well as the last of the session. Dr W. B. Carpenter described two microscopes by Nachet of Paris, who was the first to successfully work on the principle of stereoscopic binocular microscopy.—Professor T. Rymer Jones read a paper on the Larva of *Corethra plumicornis*. The creature has hitherto been very imperfectly described, and has, in fact, only been figured as a serpentine larva, with a hook at the end of its tail. Its really wonderful structure, and the startling rapidity with which its tracheal system is developed, were explained by the professor in his peculiarly eloquent and lucid manner; and he concluded by observing, as a useful hint to those who would preserve it as a permanent object for the cabinet, that it must be mounted neither in spirit nor glycerine, but merely in distilled water, in a cell hermetically sealed in the usual way.—The Rev. J. B. Reade made a few remarks (which were confirmd by Mr. Browning) supplementary to the paper read by him at the preceding meeting to the effect that the dichroic solution then described was found to yield a different spectrum when viewed by reflected light from that produced by rays transmitted through it.—

Various presents of books and objects were acknowledged, and eighteen gentlemen were elected Fellows of the Society.

LINNEAN SOCIETY.

At the meeting on *June* 6.—G. Bentham, Esq., president, in the chair. The President nominated J. J. Bennett, Esq., Dr. J. D. Hooker, Sir J. Lubbock, Bart., and W. W. Saunders, Esq. ; Vice-Presidents for the year ensuing: Messrs. T. C. Allbutt, J. Colebrook, E. Newton, and Dr. C. Meller were elected Fellows.—Living specimens of *Mermis nigrescens* were exhibited by Dr. Iliff, which had suddenly appeared in great abundance in gardens near Epsom, after heavy rain and thunder. The occurrence of the same worm, under similar circumstances, and about the same time, in other localities, had been observed by several of the Fellows present. Dr. Cobbold exhibited specimens of *Lepidium ruderale*, which he had gathered at Southall, Middlesex.—The following papers were read, viz., "Further Observations on *Cygnus Passmori*, and *C. Buccinator*," by the Rev. W. Hincks. "Notes on the Thysanura, Part III.", by Sir John Lubbock, Bart. "Notes on some Insect and other Migrations observed in Equatorial America," by Mr. R. Spruce. "On the Mechanical Appliances by which Flight is attained in the Animal Kingdom, by Dr. J. B. Pettigrew.

BOTANICAL SOCIETY OF EDINBURGH.

The monthly meeting of the Society was held on the 9th ult., in the histology class-room at the Royal Botanic Garden ; William Gorrie, Esq., Vice-President, in the Chair. The following communications were read :—1. "On Submarine Forests and other remains of Indigenous Wood in Orkney." By Dr. William Traill, St. Andrew's.—With the exception of the island of Hoy, where bushes of Mountain Ash, Birch, and Aspen Poplar are found in some sheltered nooks, no natural wood now grows in Orkney, nor is there any reliable account of trees having existed there in former times. Nevertheless there are submarine forests in Orkney, and while history is uncertain, we are fortunately in possession of other silent records of the past, which enable us to affirm that at some period anterior to the Norse invasion these islands were inhabited by a rude race of men who appeared to have obtained a part of their subsistence by hunting deer and other wild animals in the forests. This is clearly proved by numerous remains of human habitations, constructed of stone, found on nearly all the islands, which generally contain horns and bones of the red deer, and of a species of ox, Bos longifrons, along with bones of the hog and other smaller quadrupeds and birds, including the Alca impennis, or great auk, which has become extinct in Orkney only during the present century. The specimens of antlers and bones of red deer are interesting, not only as relics of a fauna locally extinct, but they are also valuable as enabling us to connect the period at which these forests grew with undoubted marks of the presence of human inhabitants ; so that it is evident that before the epoch of the forests and their fauna had terminated, that of the human inhabitants had commenced. Most of the principal islands of Orkney show remains of trees in their peat mosses. During last summer I visited the island of Hoy, and on passing by a farm where extensive draining was going on, I observed that the surface of the ground on each side of the trench was literally lined with fragments of decayed trees that had been thrown out in the process of digging. In the island of Roussay, where I spent a few days in the summer of 1865, there were many traces of ancient forests, not only in the peat mosses towards the centre of the island, but also in two places on the coast much below high-water mark. The trees, for the most part, lay deep in the peat, within a few inches of the clay or rock. Some were prostrate, but the stumps of others appeared quite undisturbed, their root fibres being traceable in all directions through the ground. Many of the smaller branches were flattened by pressure. None of the stems that we saw exceeded 6 or 8 inches in diameter, though we were told that larger pieces are often found by the peat cutters, who dry them in summer, and add them to their winter stock of fuel. It was not easy to determine the different kinds of trees with any certainty. Birch could be distinguished by the peculiar appearance of its silvery bark ; other trees had rough thick bark not unlike Pine ; that Hazel was one species is evident from the extraordinary abundance of the nuts ; leaves also of different shapes are occasionally found wonderfully well preserved. Some of the sites of these trees are curious enough. There is a fresh water lake in the island of Hoy, where trunks and branches of trees are found in abundance under water. I have not myself seen the place, but while exploring with my friend among the hills of Rousay we came upon trees in a somewhat similar place, viz., in a mill dam of 2 or 3 acres in extent, which, owing to the unusual heat of the summer, was perfectly dry, and its black surface was deeply fissured all over. On raising some of the cracked masses of peat, we found that the entire area was full of dead branches and roots of trees, and when we examined the sides of the dam or reservoir, we saw many stems and branches of trees projecting horizontally from the peat. Most of them were about the thickness of a man's leg, but some were a good deal larger ; they were all much decayed, and in some instances were so macerated by the water that they were reduced to a pulpy mass of fibres. In the winter of 1838 there was a long-continued gale of north-east wind, which entirely cleared away the shell sand from about 50 acres of the flat surface usually left dry at low water (our rise and fall of tide is 12 feet, and sometimes as much as 15 feet). Going down one day at low tide, I was astonished to see, instead of the white sand, what appeared a wide stretch of black moss covered with fallen trees, lying with their roots sticking up, exactly as I saw trees afterwards in Canada laid prostrate by a hurricane. I went down to the moss, stepped from trunk to trunk of the trees, and found their substance, when cut into by a spade, quite the same as that of the moss in which they lay, just that of our blackest coal peat. The largest of the trees seemed not more than 2 feet in diameter, and all were lying in the same direction, from S.W. to N.E. I secured several specimens with the bark on, but they soon dried and fell into dust. On taking to a boat, I found the same moss surface, mostly denuded of sand, showing itself under the deep clear water, with trees lying along its surface, quite across the bay to Tuftsness, four miles off, where a rupture of the peat had taken place, as all over that ness, under 9 or 10 feet of blowing shifting sand, the same peat moss and tree remains are to be found as under the waters of the bay, although raised above high-water mark some 10 or 12 feet.——2. "On the Lichen Flora of Druidical Stones of Scotland." By Dr. W. Lauder Lindsay.——3. "Notice of some rare British Mosses recently collected near Edinburgh." By Mr. John Sadler.——4. "Notes of an Excursion to the Forest of Fontainebleau." By Mr. George W. R. Hay.——5. "Miscellaneous Communications."

Correspondence.

[*Under this head we shall be glad to insert any letters of general interest.*]

SPIDERS.

SIR,—About the end of February I discovered hidden in a hole in a wall, and enclosed in a thick mass of web, a large garden spider (*Epeira diadema*). It was very dark in colour, but was distinctly marked with those beautiful pencillings which characterise this species. I am unable to ascertain whether as a rule this species hybernates, or whether the individual I found differed from its kind in living through the winter. I have kept a few Geometric spiders in captivity, which have grown to an unusual size; but, although supplied with flies till late in the year, on the approach of the cold weather they all became benumbed, and never again awoke from their torpidity. Moreover, during the spring and earlier part of the summer I have never observed any spiders of this kind of the large size to which they attain in the autumn, so I fancy they die in the winter. At this date, indeed, the weather has been so unusually cold and wet, that I have not found any but very small ones. I find that the Water spider (*Argyroneta aquatica*) lives throughout the winter in its watery nest.

I should be glad if one of your readers would inform me whether spiders in general hybernate or die in the winter, and give me some particulars of this species.

Yours obediently,
ARTHUR G. HARVIE.

London, June 6th.

Short Notes.

THE BEAVER.—The *Cosmos* publishes a paper by M. Hoefer, containing some curious information regarding the beaver. This animal, it appears, was not much known among the ancients; Aristotle and Pliny only mention it from hearsay, whence it may be concluded that it preferred the northern parts of Europe, which were still thinly peopled and uncivilised. About the beginning of the 17th century some might still be seen on the banks of the Danube, on those of the Rhine, and even of the Marne, as also in Switzerland. There is an old cookery-book, entitled *Liber Benedictionum*, by Eccard IV., abbot of St. Gall, in which the flesh of the beaver is considered a delicacy; nay, the good monks of the convent, who were notorious for their strict adherence to the rules of a penitent life, had found out that the beaver was a fish, and might therefore be eaten on Fridays, a very unlucky circumstance for the poor animal, and which must have greatly contributed to diminish its numbers. The *Liber Benedictionum* informs us, by the way, that the peacock, swan, stork, and wild duck formed part occasionally of the bill of fare, as did also the bear; it was, however, admitted on all hands that the latter was not a fish; whether birds were or not, is not stated. To return to the beaver, its real *habitat* is Canada, whence it has spread over all countries down to the 43rd parallel of latitude; only in Europe and Asia it seems gradually to die out. There are still some in Norway, Lapland, and especially in Siberia, on the banks of the Oby. The question arises whether the solitary beaver, which does not congregate with its kin, and has a dull, dirty-looking fur, is the same as the gregarious breed, building dwellings on piles, and having a sleek and shining skin? M. Hoefer replies to the question in the affirmative. In his opinion there is but one species of beaver, the *Castor Americanus*; the Canadian beaver, when brought over to Europe becomes solitary. In support of this opinion he relates the following singular anecdote:—Frederick II. of Prussia had caused a considerable number of beavers to be brought over from America, for the purpose of acclimatising them in the environs of Berlin. But the poor creatures became melancholy, and instead of congregating and building their village, as is their custom in their own native haunts, they separated from each other; their fur, which at first was so glossy, became dull and rough, and, by burrowing in the sand, they rubbed their skins bare so as to assume the appearance of mangy dogs. They did not multiply, and died away one by one.

SAND MARTINS.—I was at Weybridge a few days since and spent a very interesting half-hour in watching the proceedings of a colony of these pretty little summer visitants, who have taken up their quarters in a sand-bank close to the station. They numbered many hundreds, and a porter, more intelligent, I mean more observant, than the general run of porters, assured me that previously to the setting in of the cold winds which have prevailed during the last fortnight, there were twice as many at least. The birds were all in pairs, and busy beyond description in their own pleasant fidgety way, about some process of nidification, but which, for the life of me, I could not discover. Can you or can Mr. Buckland or any other naturalist amongst your readers assist me? The birds, sometimes singly, generally in pairs, after circling in rapid flight high in the air, took the neatest "headers" into their respective holes, (how they distinguished them seems a mystery, for the bank is perforated like a cullender, and each aperture the precise counterpart of the other), remained within for ten or fifteen seconds, and emerging with a smart cheery twitter, renewed their aërial evolutions. I could not detect, though close to them and watching most carefully, anything whatever in their bills, and it is difficult to imagine what building materials they could find in the upper regions of the air, neither did they carry anything out with them so far as I could see. The holes were apparently dug to the usual depth, from two to three feet, and the fine sand extracted was accumulated in a soft heap below; the eggs, I think, are not yet laid, certainly there are neither sitting nor young birds. What, I ask, is their object in perpetually visiting the interior of their future nursery establishments? I got up to a few holes and found them, as I said, some two or three feet in depth, driven horizontally, and as well as I could plummet them, without any turning, into the sand bank. The fleas, as usual, clustered at the mouth, and in return for their board and lodging afforded a most effectual safeguard against impertinent but thin-skinned intruders like myself.—J. R., *Land and Water*, May 25th.

RUMELIAN ROSES.—Mr. Blunt, the British Vice-Consul at Adrianople, in his report to the Foreign Office this year, gives an account of the Rose fields of the vilayet of Adrianople, extending over 12,000 or 14,000 acres, and supplying by far the most important source of wealth in the district. This is the season for picking the Roses—from the latter part of April to the early part of June; and at sunrise the plains look like a vast garden full of life and fragrance, with hundreds of Bulgarian boys and girls gathering the flowers into baskets and sacks, the air impregnated with the delicious scent, and the scene enlivened by songs, dancing, and music. It is estimated that the Rose districts of Adrianople produced in the season of 1866 about 700,000 miscals of attar of Roses (the miscal being 1½ drachm), the price averaging rather more than 3s. per miscal. If the weather is cool in spring, and there are copious falls of dew and occasional showers, the crops prosper, and an abundant yield of oil is secured. The season in 1866 was so favourable that eight okes of petals (less than 23 lb.), and in some cases seven okes yielded a miscal of oil. If the weather is very hot and dry it takes double that quantity of petals. The culture of the Rose does not entail much trouble or expense. Land is cheap and moderately taxed. In a favourable season a donum (40 paces square) well cultivated will produce 1000 okes of petals, or 100 miscals of oil, valued at 1500 piastres; the expenses would be about 540 piastres—management of land, 55; tithe, 150; picking, 75; extraction, 260—leaving a net profit of 960 piastres, or about £8 11s. An average crop generally gives about £5 per donum clear of all expenses. The oil is extracted from the petals by the ordinary process of distillation. The attar is bought up for foreign markets, to which it passes through Constantinople and Smyrna, where it is generally despatched to undergo the process of adulteration with Sandal-wood and other oils. It is said that in London the Adrianople attar finds a readier sale when it is adulterated than when it is genuine.—*Times*.

TOMTIT'S NESTS IN A LETTER-BOX.—A gentleman writing to the *Field*, June 7th, says: I have observed several letters giving instances of this bird's having nested in curious places. Probably the following will interest many of your readers: For four years past a pair of tomtits have built in an unused letter-box in the side-door of my house, and have reared their young. This year they have nine little ones, now nearly ready to fly. There was a tenth, but he has somehow vanished. Mrs. Tomtit is very tame, and never thinks of leaving her eggs or young ones when the box is opened, but will allow herself to be pushed to one side and the family to be inspected, only protesting by hissing, and sometimes—probably after a tiff with her lord, or when the babies have been unusually trying to her temper—by beating with her wings. Mr. Tomtit is rather more shy, popping his head, with a tempting green caterpillar, through the slit of the letter-box, a solace to his spouse attending her sedentary material duties; but Mr. Tomtit himself does not like to be handled. Now that there are nine great hungry mouths to fill, the scene is busy and exciting. Every two minutes one of the old birds enters the nest, with one, two, and sometimes three luscious green caterpillars in its bill. These it breaks up and distributes down the throats of its hungry nestlings, putting its head well down, and giving a good shake, as a preventative to choking; then, taking in its bill any droppings from the young birds, before such droppings can fall to the nest, it flies away with them, showing the greatest care that the nest shall be always clean and wholesome. Should there be no sanitary arrangements to attend to, it takes a crumb of bread for its own delectation, and flies off after more caterpillars. Sometimes both old birds will be in the nest at once, breaking up the crumbs put in for them, and giving their young ones a change of food. The old birds take no notice of the box being wide open, and three or four amused human faces within a yard of them, but proceed with the business of their lives, totally indifferent to our presence.

A BIRD'S PERSEVERANCE.—"About the end of June last (says Mr. Gurney) a spotted fly-catcher began to build a nest over the door of the lodge at the entrance of my grounds. The woman who lives in the lodge, not wishing the bird to build there, destroyed the commencement of the nest. Every day for a week the bird placed new materials on the same ledge over the door, and every day the woman removed them, and at the end of a week placed a stone on the ledge, which effectually baffled the fly-catcher's efforts at that spot; but the bird then began building at the latter end of the ledge, from whence it was also driven, and three stones being then placed on the ledge, the bird relinquished the attempt to build at either end of it, and commenced building a nest on a beech-tree opposite, which it completed, and laid two eggs in it. When the bird was thus apparently established in the beech-tree, the stones over the door were taken away, when the fly-catcher immediately forsook its nest and eggs in the beech, and again commenced building over the door, on the part of the projecting ledge which it had first chosen. The nest was again destroyed, and two slates placed over the spot. The bird contrived to throw down one of the slates from a slanting to a horizontal position, and then began to build upon it. The nest was again destroyed, and the three stones replaced, and kept there a fortnight, after which they were again removed, and directly they were taken away the bird again began building. The nest was subsequently destroyed several times in succession. The bird was twice driven away by a towel being thrown at it. A stone, wrapped in white paper, was placed on the ledge to intimidate it, but the fly-catcher still persevered, completed a nest, and laid an egg in it. On hearing the circumstances, I directed that the persecution of the poor bird should cease, after which it laid two more eggs, hatched all three, and successfully brought off its brood."—*Stevenson's Birds of Norfolk.*

NEW USE FOR POTATOES AND OTHER VEGETABLES.—There is at present to be seen at the Paris Exhibition objects apparently formed of meerschaum, or of stags' horns, but which, nevertheless, are made of very different substances. The imitation of meerschaum is obtained by peeling sound potatoes, macerating them for from twenty-four to thirty-six hours, in water acidulated with eight per cent. sulphuric acid, washing them with fresh water, until they no longer redden litmus paper, wrapping them in blotting paper, then drying them in warm sand, or on plates of chalk or plaster of Paris, which are changed daily for several days, and at the same time compressing them. An excellent imitation of meerschaum, which will take colours well, will thus be obtained; but it will not answer for pipes. The result will be harder, whiter, and more elastic if three per cent. caustic soda is used instead of the sulphuric acid. If, after having been macerated for twenty-four hours in the soda solution, the potatoes are boiled with nineteen per cent. soda, a substance resembling stags' horn will be obtained. The acid or the alkali must be carefully washed away. Turnips treated in the same manner as the potatoes afford an excellent imitation of stags' horn, which may be cut into thin plates for veneering, and may be made as flexible as leather, by agitation in glycerine or water. Carrots, treated in the same way, afford a fine imitation of coral, which answers admirably for veneering and other purposes.—*Scientific Review*, June.

ARTESIAN WELLS IN ALGERIA.—Twenty-three years ago the French colonists of Algeria made their first attempts to sink artesian wells in their newly-acquired territory; but after boring in two places in the province of Oran to a depth of 98 and 176 mètres without striking water, the attempts werea bandoend. In 1856, operations were resumed by the military corps of engineers, and from that date, with two or three exceptions, every boring has succeeded; and at the end of 1864, seventy-five wells were flowing and delivering 4,200,000 litres of water every hour, or 100,000 cubic mètres a day. The water is limped and drinkable, but generally a little brackish. The effect of such a supply on the social life and industry of the country may be imagined. A village and date plantations rise up around every well, and the natives, having something to lose, prefer peace to predacity. Thirty-five of the wells are in the Ouled Rir district, which stretches far to the south. The deepest well is 175 mètres, the shallowest 29 mètres, and the total of all the borings amounts to 6,628 mètres. The entire cost, defrayed by a tax on the natives, was 400,000 francs. Among the material results, we are informed that 150,000 date-trees have been planted in the Ouled Rir district alone, besides fruit-trees of other kinds, and more than 2,000 new gardens have been formed. We may expect that these beneficial operations will be continued, for four boring brigades have been established, all well provided with implements, for the purpose of systematic exploration, and to sink wells in places likely to yield water. Guided by years of experience, their failures are now but few, and year by year their knowledge of the local hydrography, surface and subterranean, becomes more complete.—*Athenæum*, June 1st.

ASSEMBLAGE OF BEETLES.—Walking along the cliff from Ramsgate to Margate, with a strong south-wester blowing, I retired down a gully or "stair" (as they call them in the ordnance maps) to smoke a pipe out of the wind. The tide was up, and I found myself on a small bay of sand, bounded landwise by perpendicular chalk cliffs. The sand to the lower part of the cliffs were covered with thousands of beetles evidently blown down from the fields above by the wind. I counted over thirty genera, most of them represented by four or five species. The insects were mostly on their backs; and, with the exception of some *Bembidia* and a small *Choleva* (*anisotomoides*), they were almost torpid. When put upon their legs they made but feeble efforts to get away, and seemed to be unable to get a footing on the fine sand. I never before saw such a quantity and variety of beetles together in so small a space (about thirty yards), to be got without the least trouble beyond picking them up. It was collecting made easy, as I never saw it before. The exact spot is between Foreness and Whiteness, not far from a cockney erection called Neptune's monument. I subjoin a list of the genera as far as I can recollect:—*Notoiphilus*, *Calathus*, *Anchomenus*, *Pterostichus*, *Amara*, *Anisodactylus*, *Harpalus*, *Bembidium*, *Ilybius* (*! !*), *Homalota*, *Mycetoporus*, *Philonthus*, *Xantholinus*, *Lithocaris*, *Silpha*, *Choleva*, *Helophorus*, *Sphæridium*, *Cercyon*, *Aphodius*, *Agriotes*, *Cneorhinus*, *Sitones*, *Alophus*, *Phytonomus*, *Trachyphlœus*, *Cryptorhynchus*, *Lema*, *Crepidodera*, *Coccinella*, *Coccidula*, *&c.*—W. C. De Rivaz, 4, Shrewsbury-road, W.—*Entomologist*, June.

HORNS OF THE ROEBUCK.—The first indications of the future horns of the roebuck are two rounded knobs, covered with the well-known "velvet;" these are succeeded by straight simple points, three or four inches long, and in this state the young roe is termed by the German jagers "Spiess bock" (literally, *spear-buck*). In due course these are succeeded by forked horns, having one point or antler directed forwards nearly at right angles with the "beam" or main stem; at this season the bearer is a "gabel-bock" (*i.e. fork-buck*, or forker). Another year sees the full complement of three points, the first or lower being directed forwards, the second or upper backwards: after this no further branches are added, although the horns become more heavy and massive as the animal becomes older. But these changes are not always regularly gone through, and although six points, three on each horn, is the full natural complement, heads with seven, eight, and even ten and twelve branches are to be seen in the museums of Germany, where the collecting of deer's horns is a not uncommon mania. Many of these large and magnificent head-gears belonged to roe-deer shot in the last century. The same thing holds good of the red deer (*Cervus elaphus*), so much so that some German naturalists assert that a different variety of the stag, with larger horns ("Brandthirsch"), was then found in Europe; but the fact that many of the old roe heads are equally wonderful in their development, seems to point to the better feeding and greater age of deer of old days as the cause of their superior beauty and size of horn.—*Zoologist*, June.

THE MILKMAN'S PONY AND DOG.—Sir Emerson Tennent's interesting anecdote of the reformed vicious pony, and his now tractable behaviour and proffers of assistance to his master the milkman during his morning rounds, was so highly appreciated and was such a rare instance of gratitude and intelligence in the animal, that I may consider myself fortunate in having it in my power to offer a companion to it in the eccentricity of a dog, whose attachment to both master and pony is shown in the following very singular manner. Mr. Startin, of Richmond, dairyman, now possesses a dog, of the black-and-tan terrier breed, that may be daily seen perched on the back of his stable companion, the horse, whilst making his usual business calls. The affection of the two animals to each other is unequalled in the history of such sympathies. The dog appears perfectly at home in his precarious position, and whether at a walk, trot, canter, or full gallop, is scarcely ever seen to falter in his equilibrium. During Mr. Startin's absence the dog guards, like a faithful servant, both horse and cart, and sticks to his post. So long have the two animals been now allowed to continue in the indulgence of their favourite habit, that it becomes a question of consideration what would be the consequences of a separation. They may still be seen every day at their united labours, to the amusement of the good people of Richmond and the surrounding neighbourhood.—A. H. B.—*Land and Water*, June 15.

A FLIGHT OF LOCUSTS.—At Malta about noon on Saturday, the 9th inst., the sky became filled with locusts, which appeared to be travelling from east to west over the island. The main body preserved a high altitude, but many, perhaps tired by their long flight, settled in different localities along their route. A light breeze was blowing from the westward, so that the insects were proceeding head to wind. The town was quite in a state of excitement. The boys were catching the locusts in their hats, and the sparrows and jackdaws were feasting on them in the air with evident satisfaction. This extraordinary spectacle lasted all the afternoon. During the whole of this time they never ceased passing for a moment, and towards sunset their numbers were considerably augmented. In some parts of the country the fields and gardens were covered with them. Most fortunately, for some unaccountable reason, they made no long stay, and on the following morning, with the exception of a few stragglers, had all disappeared. Nor do we hear of any serious damage having been done by them to the crops, which have already suffered much from the continued absence of rain. A similar visitation occurred at Malta in 1814, the year after the plague; and in 1850 a cloud of these insects appeared on the eastern side of the island and did some injury. —*Malta Times.*

MONKEYS STEALING SPECTACLES.—I am reminded by two communications in your last impression, one on the subject of pickpockets at the Zoo., and the other on the Clifton Zoological Gardens, of a curious incident which I witnessed at the latter place in 1865. The usual stout elderly gentleman of the genus *flâneur* was fixedly regarding the gambols of the monkeys, when an active individual suddenly snatched the spectacles from the old gentleman's nose and made off with them, followed, of course, by the rest of his monkey friends. The antics he played with the spectacles were most amusing to all but the old gentleman, who was scarcely aware of his loss till he saw his barnacles astride the ridgeless nose of the depredator. You can fancy the wild hunt which took place of all the rest of the monkeys after the fortunate thief, and how, when chevied into a corner, he deliberately took off the spectacles and knocked out the glasses, and, failing to break them, rubbed them fiercely against the floor of the cage to spoil their transparency. The old gentleman at last recovered his spectacles minus the glasses, but he will probably keep his nose at a safe distance from the cage for the future. I think a valuable article might be written upon the thievish propensities of animals; perhaps from the habits of the raven, magpie, jackdaw, and monkey, which steal things of no possible use to them, we might obtain some elucidation of the senseless extravagance, and acquisitiveness, and kleptomania of the human species.—C. H., *Land and Water*, June 1st.

EXTRAORDINARY FECUNDITY IN A CAT.—The circumstance I am about to relate occurred at a sheep farm situated about 150 miles from Monte Video. A cat of about ten months old, born on the place, became pregnant, and as the time for kittening drew near was a source of astonishment to every one at the estancia, for the animal swelled almost as broad as it was long, though seemingly it did not experience any pain. On the night of the 7th of October she brought forth four kittens, one of which only was born alive, but died the next morning. On the following night, the 8th, she had three more, also all born dead; but still she appeared very much swollen, and on the evening of the 9th she again brought forth three, which were also born dead—thus making ten kittens at the first litter, which seems to me to be an extraordinary number for so young a cat, and, indeed, for any. However, pussy, although she had lost all her kittens, did not seem at all unhappy, but made friends with a little bitch at the house, who had two pups just born, got into the box in which she was, and now lies all day fondling the pups, which seem quite as contented with her as with their mother, and suck the two—*i.e.*, their mother and the cat—alternately. — L. H. D. (Banda Oriental, South America).—*Field*, June 15.

BEE-KEEPING IN CALIFORNIA.—I have read some very nice articles on bees in *Land and Water*, so you may like to have a little account of bee-keeping in California. The honey made over there is very fine. No doubt the beauty of the various flowers and plants contribute greatly to its sweetness. A friend of mine lately saw an apiary near San José, consisting of a hundred and fifty hives. They were placed in an orchard of nine hundred trees, and all the swarms were produced from forty hives with which the owner had begun the season. The orchards in California are magnificent. The one in question had a hedge of "yoularia," or holly-leaved cherry, grown from seed. Its beauty and symmetry were described as most remarkable. There were two kinds of evergreen cherry, and many Chickasaw plums in full bearing, with delicious peach trees; but the most beautiful and striking object was a circular "driveway" of over a mile in length, leading from the house to the apiary and orchard. This hedge was made of the osage orange, backed by a double row of ornamental trees, with a choice number of Cherokee roses in full perfection. The graceful curves of this serpentine drive, and the rich fragrance of the flowers, combine to make the place in question one of the very loveliest on the Pacific coast. Landscape gardening was thoroughly understood by the man who laid out Colonel Y.'s Californian grounds. There was a mission of San José, but, strange to say, the proprietors of it evidently did not understand horticulture so well as the military man, for all the old fine trees (some thousands of them) were dying away in the grounds, orchard, and vineyard of the mission when Colonel Y. came to the neighbourhood. The vicinity of San José and Santa Clara is called the garden of California, and the Colonel has some large, though young, *Morus multicaulis* trees, and contemplates making no end of silk.—H. E. W., *Land and Water*, May 25th.

THE LARVÆ OF HYDROPTILA.—On Good Friday I selected from a small tributary of the Darenth many cases of *Hydroptila*, concealed in the crevices of the under surface of stones. These contain green larvæ, and apparently pertain to *H. pulchricornis*. A miniature aquarium, consisting of a tumbler and plant of *Callitriche*, has enabled me to watch their habits more narrowly; and I notice a peculiarity not I think hitherto observed in Trichopterous larvæ. It is well-known that the larvæ of most of the larger species, with portable cases, sink rapidly to the bottom when disturbed, but in *Hydroptila* the larvæ remain suspended by a thread in mid-water, in the same manner as many Lepidopterous larvæ are suspended in mid-air; and by this thread they are enabled to regain their lost position without the trouble of commencing *de novo* at the bottom. The little, flattened, seed-shaped cases are very interesting objects; but I almost despair of rearing the imagos, as the conditions afforded by the highly aërated bubbling streamlet in which they were found, are too different from any with which I have the means of supplying them. The cases, while the inmates are yet in the larva state, seemed to be composed entirely of coarse silk, but, before the change, minute sand-granules are worked into the outer surface, thus rendering them much firmer.—R. McLachlan, Forest-hill.—*Entomologist*, June.

THE BURYING BEETLE.—Many years ago, when living in Devonshire, I found a dead rat lying in the shrubbery. Being struck with its *basso relievo* appearance, I examined it more closely, and observed a threadlike border of the finest mould all round it, enclosing even the tip of the tail. Suspecting the cause, I carefully lifted it, and found, as I expected, a pair of burying beetles at work. They were both black, and, as well as I remember, exhibited no peculiarity of shape or appearance; but I did not examine them closely, being unwilling to disturb them, and having an intense antipathy to handling a rat. Last week, while walking across some fields near Highgate, I was surprised at seeing the half-dried mummy of a toad stir, and feeling convinced that it could have no life in it, I turned it over, and found beneath it a solitary beetle, barred with black and yellow like a wasp, and in size between that insect and a hornet. I watched it for some time, and, wishing to give it a safer place for carying out its apparent propensity for an undertaker's work, I moved it a little out of the path, on which the insect made a cast like a hound, and soon found the body. I then moved it a foot, when the beetle, missing it, took wing and soon recovered it. I then moved it away about a yard, but the beetle did not seem equal to re-finding its prey, and ultimately flew off. On returning in the evening I found the toad still undisturbed.—C. C. C. in the *Field*, June 8th.

AN EDIBLE FRUIT.—Mr. Walter Hill, the director of the Botanic Garden at Brisbane, records in the *Queenslander* the existence of an Edible Fruit indigenous to the colony:—"Some years ago," says Mr. Hill, "I discovered in the coast scrubs a small, but rather handsome, tree, the botanic name of which is Macadamia ternifolia; but I was not aware, until recently, that it bore an edible fruit, and, singular to say, the aborigines appear to have been equally ignorant. The tree is now bearing abundantly in the scrubs, both to the southward and northward, and in several localities the children of the Europeans, as well as those of the blacks, are regularly employed in gathering fruit for the purpose of food. The fruit is about the size of a walnut, and contains within a thick pericarp a smooth brown-coloured nut, embracing a kernal of a remarkably rich and agreeable flavour, resembling in some respects that of a filbert, but, to my taste, much superior."

HAIR WORMS.—Several persons have written to the scientific papers during the past few weeks describing the appearance of thousands of these insects; some from Croydon, some from Epsom. The following describes their appearance at Brixton and neighbourhood, sent to the *Gardeners' Chronicle*, June 15th:—The violent thunderstorm, accompanied by a deluge of rain, which burst over the metropolis in the early morning of Monday, the 3rd inst., was followed in the course of a few hours by a curious phenomenon but rarely observed. The rose bushes and other shrubs in various gardens at Kennington, Brixton, and other southern suburbs, were seen to be swarming with small, slender hair worms (about two or three inches long, and not thicker than a lace-pin). These creatures are occasionally found in the earth, but they are parasitic in the bodies of different kinds of insects, A correspondent from the neighbourhood of Carlisle. in a letter also dated the 3rd inst., informs us that he had found a number of these creatures in his garden, stating that "they come out in quantities in our garden on *damp* evenings. They are long, hair-like looking worms, from three to four inches in length, rather pale in colour, and their habit is to wind half of their length round some leaf or stalk, and make a circular sort of motion in the air with the other half." Their history is very obscure, but we believe they are in no wise injurious to plants.

YOUNG CANARIES FED BY AN OLDER NESTLING.—The following appeared in the *Field* (June 8th). I think the following fact will be interesting to many of your readers. I have bred canaries for many years, and have never seen such an example of affection. Early in the season I put up a favourite cock and hen canary, hoping for a fine nest of young birds. Our bitter third or fourth winter nearly killed my birds, and only one young one came to maturity. Since then the hen has laid again, and I have four healthy darlings to cheer me and to watch; and during these watchings—can you believe it?—I see the first young bird, which is a very fine one, feeding its brothers and sisters, and this constantly. The mother is again laying, and the father and son between them (for I fancy it is a young cock) bring up the four little creatures in the old nest. I think it so extraordinary a thing that it is well worth a place in your columns, for the bird is not more than two months old, if it is that.—Henry John Morant (Newnham Rectory, Winchfield, Hants.)

LAGO MAGGIORE.—The Italian papers continue to give very interesting accounts, in a geological sense, of the land convulsions on the borders of the Lago Maggiore. Some time ago a small village on the shores of this water disappeared within the bosom of the lake, its immersion being caused by an extensive land-slip. It now appears that, for several months, the region adjacent to the Tyrolean Alps, to the Lago Maggiore, and the Lago di Guarda, has been subject to a series of convulsions, recurring at periodical intervals, by which the inhabitants have been kept in a state of great apprehension. The shores of the latter lake have been upheaved for a space of ten miles by violent oscillations, and enormous masses of stone and earth continually fall from Monte Balbo, occasioning the utmost consternation among the inhabitants of the valley.—*Athenæum*, May 25.

SILK PLANT.—The Department of State at Washington had received information from the United States Consul at Lambayeque, Peru, says the *Morning Post*, that an important discovery had recently been made in Peru of the silk plant. Preparations were being made to cultivate it upon an extensive scale. The shrub is three feet or four feet in height. The silk is enclosed in a pod, of which each plant gives a great number, and is declared to be superior in fineness and quality to the production of the silkworm. It is a wild perennial, the seed small and easily separated from the fibre. The stems of the plant produce a long and very brilliant fibre, superior in strength and beauty to the finest linen thread. Small quantities have been woven in the rude manner of the Indians, and the texture and brilliancy is said to be unsurpassed.

THE NOVEMBER METEORS.—The *Athenæum* June 1st, says Prof. Adams has determined by elaborate calculation that the periodic time of the November meteors is 33.25 years. In a communication to the Royal Astronomical Society explaining his method, and giving results obtained by other observers, he remarks, "It appears probable that the great comet of 1862 is a part of the same current of matter as that to which the August meteors belong." Should this view receive confirmation, it opens a wide field for speculation, and astronomers will agree with the learned Professor that "it is difficult to believe that the coincidences which have been noticed are merely accidental."

DOUBLE BIRD'S NEST.—Between the upright stems of an oak and two thorns, at the bottom of my garden, a pair of wrens built: whilst they were sitting a pair of flycatchers selected the top of the wren's nest for the foundation of their own, which they completed and occupied before the young wrens had flown, neither pair, so far as I could ascertain, interfering in the least with the other. The wrens have again built in the same situation, so I hope the flycatchers may return to their old home, though I fear the wrens will have left before the others commence operations.—Herbert Greenwood, Sandford Lodge, Hampstead, May 13, 1867.—*Zoologist*, June.

A MOUSE'S STORE.—Mr. J. Dickens, of the Saracen's Head (says the *Zoologist*) near Holbeach, has just discovered a mouse's nest in his garden in which a winter's store of 1329 filbert nuts had been secreted by the industrious little animal. They measured half a peck, and weighed six pounds.

Remarks, Queries, &c.

(*Under this head we shall be happy to insert original Remarks, Queries, &c.*)

Aids to Egg-collecting.—In connection with "Kellick's" observations on this subject published in the *Naturalist's Note Book* I venture to make a few remarks:—

In the first place, the practice of inscribing the names on eggs is decidedly to be avoided. Most of our British species have delicate markings which would be marred by any inscription; the point of a pen or pencil is also likely to injure the shell. No careful collector, moreover, would mix or confuse specimens which have cost him time or trouble to procure.

Undoubtedly the best method of blowing is by means of the blowpipe, of which the end can be inserted in a hole on one side of the egg; the other side and both ends then appear uninjured when mounted on cardboard or laid in wool. This advantage cannot be gained when the old-fashioned method of making a hole at each end is adopted.

It is indispensably necessary that after the egg has been blown it should be washed, and that camphor should be sprinkled all over the cotton wool in which it is laid, to prevent the interior membrane of the shell from decaying, which is often the case if proper attention is not bestowed on this subject. Some collectors recommend rinsing the egg with corrosive sublimate; but as this is extremely poisonous, and requires very great care in use, I have adopted the former method, which has proved successful.

One of the chief points to be considered while endeavouring to obtain birds' eggs is that of not robbing the pretty little nest of one more egg than is required; it may therefore be remembered with regard to our small birds, that generally speaking one or sometimes two more eggs are laid than the mother's wings can cover, and consequently, if old nests are searched for in June or July, one egg will most likely be left when the others are hatched and the young birds flown.

If this "extra egg" can be procured as soon as the usual number are laid, and the collector has patience to wait until an opportunity occurs for him to obtain a pair to it by similar means, a good collection may be formed without destroying any nests, or causing any merry little songsters to forsake their newly-constructed home.

L. H. M.

SPIDERS.—About the middle of August, '66, I noticed a spider had thrown a web from the roof covering the entrance to our yard-door to the garden wall, a distance of about one foot. To keep the frail structure steady in the wind, the spider had suspended at the end of a line of web thrown from the circular network a piece of mortar weighing about thirty grains. Like most, the web was broken; but in the course of a week or so another line was thrown to the wall, and from the centre of the line another piece of mortar was suspended. It was not dropped just over the end of the roof, but had been carried by some ingenious means half way to the wall. Having hung his weight, the spider rapidly "payed out" the circular web and the cross bars. Spiders on the look out for prey usually stand head downwards in the centre of the web. Out of twenty webs one evening I noticed eighteen in the above position. Everyone has seen a fly caught, but all may not have noticed that after it has been wrapped up the spider, still head-downward, commences to pinch his victim in the back, working with its mouth in a horizontal direction—the juices are sucked out and the frame discarded. A spider is not able well or at all to move about in a neighbour's web. Spiders fight fiercely if they have a chance of doing so. For an experiment I put two into one web, when the intruder was savagely attacked, but was too active and strong to be rolled up; and he immediately fastened a line and quickly dropped down to the under part of a leaf, where, fixing a line about the sixteenth of an inch long to support his body, he rested.

Maidstone. T. F., Junior.

DISEASES OF GOLD FISH.—Having read in the *Naturalist's Note Book* for May, 1867, an inquiry by "Aquarian," of some remedy for the film which attaches to gold fish, I have copied from a work called *The Ladies Treasury*, of August, 1861:—"Cure for the film on Gold Fish." Mr. Edward Hewitt, of Speckbrook, Birmingham, writes thus to the *Journal of Horticulture* respecting the film on gold fish:—"That, although his fish in a pond had constant accession of fresh water, yet after a year or two a kind of mouldy looking film came on them in patches, which gradually progressed to the gills, and even extended itself over the eyes, causing partial blindness, and ultimately death. A friend suggested that, as the water was deep, and the bottom muddy, the fish had no shallow scours to clean themselves upon. A place was cut out of the bank at his suggestion, and covered with water only a foot deep. At the bottom was placed sharp grit or drift sand, and small pebbles taken from the turnpike road. The fish immediately commenced cleaning themselves, by rubbing sideways over the bottom, and by this means were completely cured, and the disease never presented itself again." Now, this is the complaint which kills all fish kept in glass globes—therefore it would be well to have a second globe with pebbles and grit and about once a week turn the fish in this.—E. B.

BRITISH SHREWS.—In the article upon British shrews in the number of the *Naturalist's Note Book* it is mentioned that numbers of shrews are found dead in the autumn from some unknown reason. In an early number of *Once a Week*, 1866, it says that an eminent surgeon having dissected a quantity of them found them to be all males, and that each of them had a bite in the jugular vein, evidently from another shrew, and that it was supposed that they were killed fighting for mates for the winter.

SHREW MOUSE.

THE COMMON GREEN ENGLISH LIZARD.—I once kept two common brown lizards in a box of grass (they were captured in heath). After a time some of the scales turned of a green colour, which makes me think that the brown and green English lizards are one and the same animal, as I have always captured the brown in heath, &c., and the other in grass and green localities. I wish to know if any of your subscribers have observed the same thing?

May 29, 1867. "GLOWWORM."

FLEAS IN DOGS.—J. L.—Persian Insect Powder, is recommended by the Editor of the *Naturalist's Note Book*—but I have kept thick-coated Russian and Cuba dogs, and I found washing their backs, especially the lower part, about once a week or so, where the fleas settle most, answers very well. I used a brush and comb, and soap and warm water, and this kept the poor things free from their assailants, and made them quite comfortable.—E. B.

June 11th, 1867.

GOLDEN ORIOLES.—I beg to communicate to you the fact of a pair of Golden Orioles having having taken up their summer residence at Trescoe, one of the Scilly Islands, in the groves at the residence of Mr. Smith, the Lord Proprietor. They are evidently bent on nesting there, as they have all the appearance of birds breeding. This species has been in the habit of visiting Scilly for a long time.

EDWD. HEARLE RODD.

PRESERVATION OF INSECTS.—At p. 170, an alcoholic solution of corrosive sublimate is recommended for the preservation of insects. Let him who uses it beware; I once spoiled a fine lot of *Lepidoptera* with it, for when the spirit evaporated, a white deposit was left on the wings, although they were effectually "preserved." J. W. DOUGLAS.

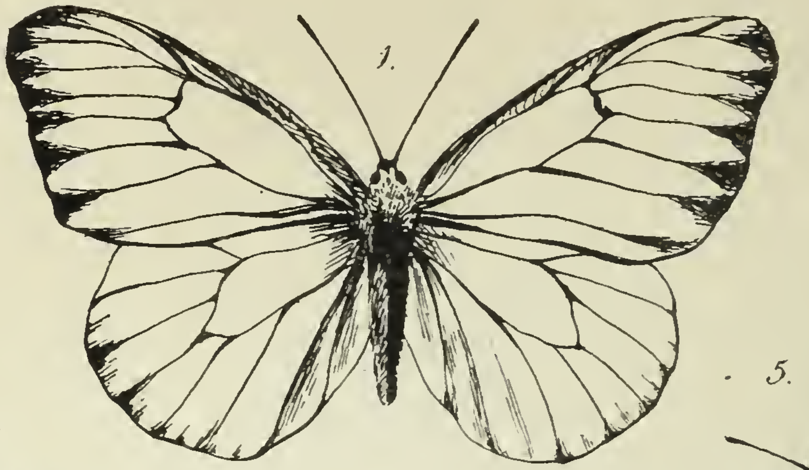
June 15th.

ENTOMOLOGICAL NOTES FOR JUNE.—Errors at p. 168.—*Rhynchites Bacchus* I once saw taken in Birch Wood, by beating the bushes; there are no *vines* in the wood, and this specimen is the only one known to be British. *Hipparchia Hero* is not a British species, the name was long ago introduced by mistake. J. W. D.

BUTTERFLIES.—I should be obliged if any of your correspondents would inform me of the best way to catch and preserve butterflies, as I have just commenced collecting them and am ignorant on the subject. R. H.

STATE OF THE WEATHER NEAR LONDON.

May and June.	Moon's Age.	Barometer.		Temperature.					Wind	Rain.	Remarks.
				Of the Air.			of the Earth				
		Max.	Min.	Max	Min	Mean	1 foot deep	2 feet deep			
Thurs. 16	12	30.054	29.977	53	32	42.5	53	52	N.E.	.00	Clouded and cold; densely clouded; overcast.
Friday 17	13	30.124	30.067	60	27	43.5	53	52	S.W.	.00	Fine; overcast; very fine at night.
Satur. 18	○	30.039	29.925	66	42	54.0	53	52	E.	.00	Frost early in morning; fine; very fine at night.
Sunday 19	15	29.867	29.714	67	45	56.0	55	52	E.	.02	Very fine; densely clouded; overcast at night; rain.
Mon. 20	16	29.570	29.529	69	50	59.5	55	51	N.W.	.76	Overcast; constant heavy rain; very wet at night.
Tues. 21	17	29·939	29.560	54	30	42.0	55	51	N.E.	.09	Clear and cold; rain; cold and wet; cloudy; frost at night.
Wed. 22	18	30.046	29.919	48	28	38.0	54	51	N.E.	.12	Clear and cold; snow mixed with hail; overcast; frosty.
Thurs. 23	19	30.101	29.937	51	25	38.0	51	50	N.E.	.00	Very cold and blustrous; heavy clouds; fine; frosty.
Friday 24	20	30.125	30.038	52	25	38.5	50	49	N.E.	.00	Heavy clouds; cloudy; fine; sharp frost at night.
Satur. 25	21	30.044	29.803	56	31	43.5	50	49	E.	.35	Slight dry haze; densely overcast; heavy rain.
Sunday 26	☾	29.640	29.533	71	43	57.0	50	49	S.	.02	Heavy rain; fine; cloudy at night.
Mon. 27	23	29.621	29.557	68	44	56.0	50	49	S.	.00	Heavy clouds; cloudy and fine; very fine at night.
Tues. 28	24	29.807	29.759	70	47	58.5	50	50	S.W.	.00	Densely clouded; fine with clouds; mild at night.
Wed. 29	25	29.929	29.836	74	44	59.0	51	51	S.E.	.04	Densely overcast; showery; cloudy at night.
Thurs. 30	26	30.021	29.929	70	50	60.0	51	51	S.E.	.04	Very fine; overcast and mild; very fine.
Friday 31	27	30.124	30.054	75	40	57.5	52	52	S.E.	.01	Uniform haze; exceedingly fine; fine at night.
Satur. 1	28	30.076	30.055	76	44	60.0	52	52	S.W.	.00	Very fine; very fine throughout.
Sunday 2	●	29.990	29.805	82	56	69.0	53	53	S.W.	.78	Cloudless and hot; very fine; heavy rain at night.
Mon. 3	1	29.819	29.587	63	43	53.0	54	54	W.	.05	Overcast and warm; rain; very fine at night.
Tues. 4	2	29.956	29.899	68	40	54.0	55	54	W.	.00	Cloudy and fine; cloudy; very fine.
Wed. 5	3	29.848	29.737	62	51	56.5	56	54	S.E.	.24	Densely clouded; rather boisterous; rain; cloudy.
Thurs. 6	4	29.730	29.665	68	48	58.0	56	54	S.W.	.02	Cloudy; fine; cloudy at night.
Friday 7	5	29.830	29.662	68	44	56.0	57	56	S.W.	.10	Low white clouds; fine; overcast.
Satur. 8	6	30.037	29.987	72	47	59.5	57	56	S.W.	.00	Fine; cloudy and fine; overcast at night.
Sunday 9	☽	30.198	30.066	75	43	59.0	57	56	W.	.00	Very fine; fine, with clouds; very fine.
Mon. 10	8	30.242	30.227	80	45	62.5	57	56	W.	.00	Exceedingly fine; very fine throughout.
Tues. 11	9	30.268	30.110	82	50	66.0	59	57	S.	.00	Very hot and cloudless; very fine at night.
Wed. 12	10	30.061	29.922	85	50	67.5	60	58	S.W.	.06	Very hot; very fine; cloudy at night.
Thurs. 13	11	30.057	29.901	66	46	56.0	60	56	S.W·	.00	Partially overcast; densely clouded; cloudy at night.
Friday 14	12	29.848	29.790	68	42	55.0	59	57	N.W.	.00	Fine; overcast; very fine at night.
Satur. 15	13	30.024	29.936	62	46	54.0	59	57	N.E.	.12	Fine, with white clouds; cold and overcast; cloudy.
Sunday 16	14	30.090	30·051	62	42	52.0	59	56	N.	.00	Overcast; cloudy; very fine at night.
Mon. 17	○	30.115	30.092	64	41	52.5	59	56	N.W.	.00	Cloudy; overcast; fine, but cold at night.
Tues. 18	16	30.032	29.978	75	59	67.0	58	56	S.E.	.00	Fine; overcast; overcast and warm.
Wed. 19	17	30.008	29.966	70	40	55.0	60	56	N.E.	.00	Hazy and warm; cloudy; overcast at night.



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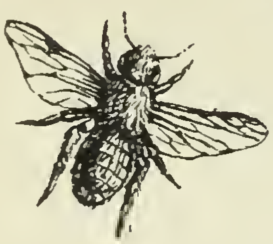

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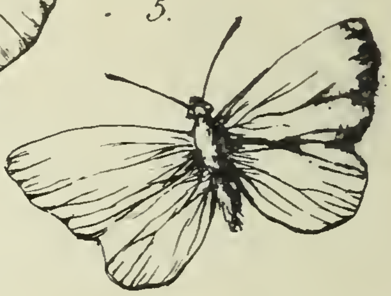

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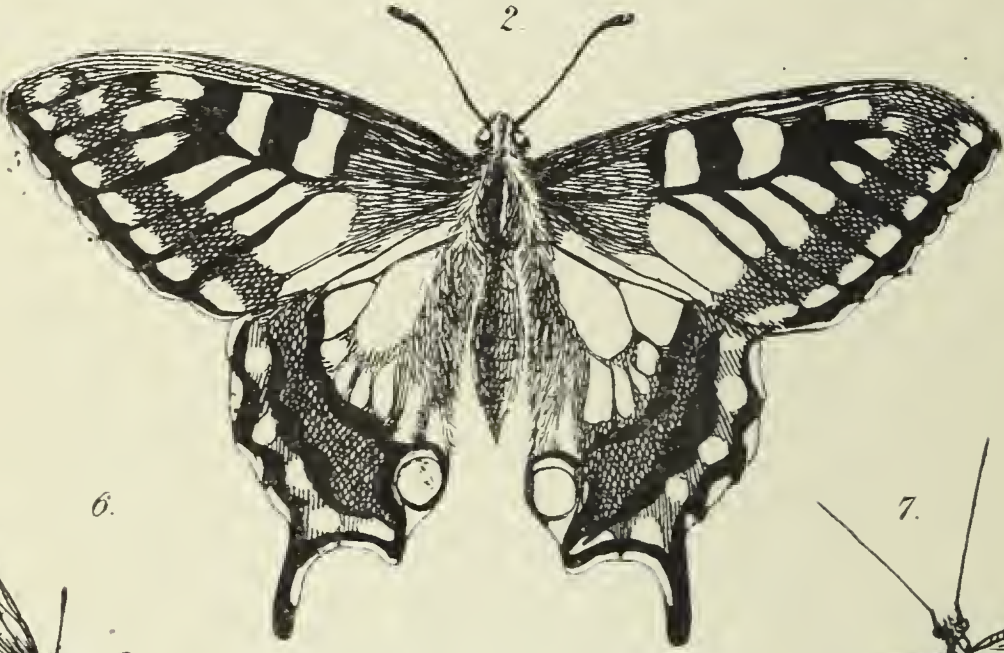

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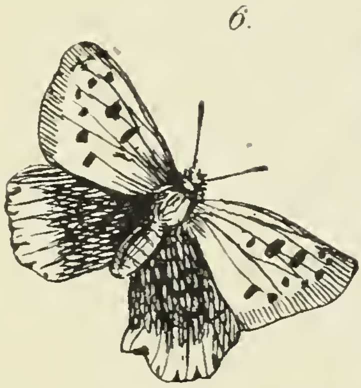

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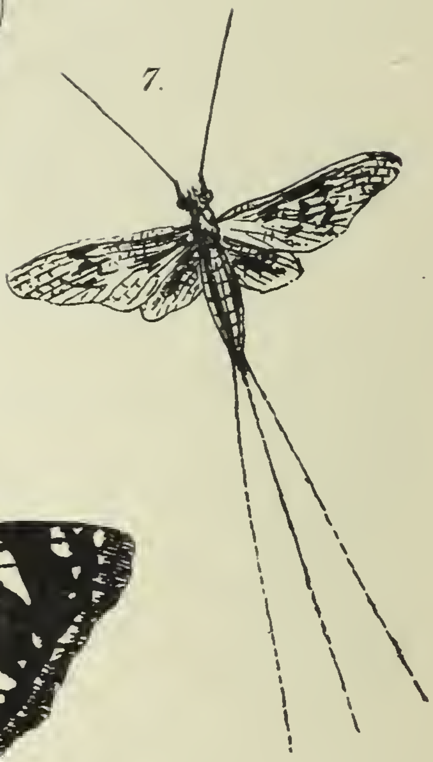

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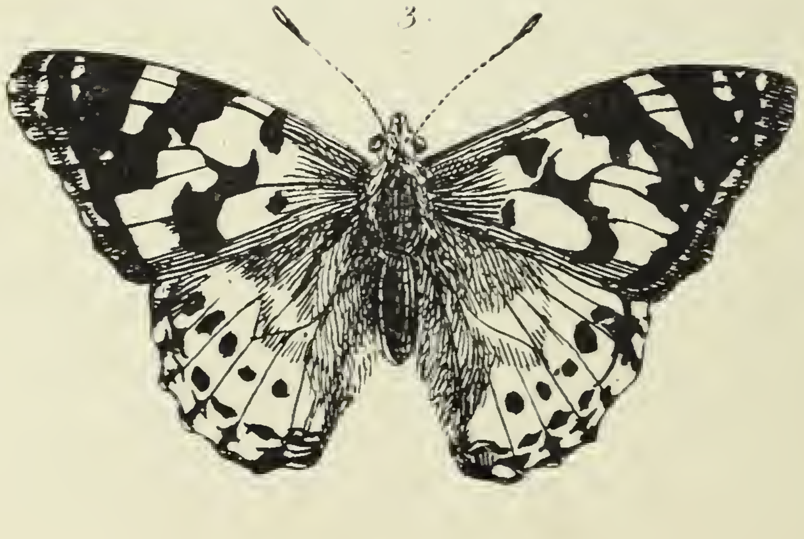

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IMITATION IN NATURE.

IT is in the insect world that the principle of the adaptation of animals to their environment is most fully and strikingly developed. In order to understand how general this is, it is necessary to enter somewhat into details. It seems to be in proportion to their sluggish motions or the absence of other means of defence, that insects possess the protective colouring. In the tropics there are thousands of species of insects which rest during the day clinging to the bark of dead or fallen trees; and the greater portion of these are delicately mottled with gray and brown tints, which though symmetrically disposed and infinitely varied, yet blend so completely with the usual colours of the bark, that at two or three feet distance they are quite undistinguishable. In some cases a species is known to frequent only one species of tree. This is the case with the common South American long-horned beetle (*Onychocerus scorpio*), which Mr. Bates informs us is found only on a rough-barked tree, called Tapiribá, on the Amazon. It is very abundant, but so exactly does it resemble the bark in colour and rugosity, and so closely does it cling to the branches, that until it moves it is absolutely invisible! An allied species (*O. concentricus*), is found only at Para on a distinct species of tree, the bark of which it resembles with equal accuracy. Both these insects are abundant, and we may fairly conclude that the protection they derive from this strange concealment is at least one of the causes that enable the race to flourish.

Many of the species of *Cicindela*, or tiger beetle, will illustrate this mode of protection. Our common *Cicindela campestris* frequents grassy banks, and is of a beautiful green colour, while *C. maritima* which is found only on sandy sea-shores, is of a pale bronzy yellow, so as to be almost invisible. A great number of the species found by Mr. Wallace in the Malay islands are similarly protected. The beautiful *Cicindela gloriosa*, of a very deep velvety green colour, was only taken upon wet mossy stones in the bed of a mountain stream, where it was with the greatest difficulty detected. A large brown species (*C. heros*) was found chiefly on dead leaves in forest paths; and one which was never seen except on the wet mud of salt marshes was of a glossy olive so exactly the colour of the mud as only to be distinguished when the sun shone, by its shadow! Where the sandy beach was coralline and nearly white, he found a very pale *Cicindela;* wherever it was volcanic and black, a dark species of the same genus was sure to be met with.

There are in the East small beetles of the family *Buprestidæ* which generally rest on the midrib of a leaf, and the naturalist often hesitates before picking them off, so closely do they resemble pieces of bird's dung. Kirby and Spence mention the small beetle *Onthophilus sulcatus* as being like the seed of an umbelliferous plant; and another small weevil, which is much persecuted by predatory beetles of the genus *Harpalus*, is of the exact colour of loamy soil, and was found to be particularly abundant in loam pits. Mr. Bates mentions a small beetle *(Chlamys pilula)* which was undistinguishable by the eye from the dung of caterpillars, while some of the *Cassidæ*, from their hemispherical forms and pearly gold colour, resemble glittering dew-drops upon the leaves.

A number of our small brown and speckled weevils at the approach of any object roll off the leaf they are sitting on, at the same time drawing in their legs and antennæ, which fit so perfectly into cavities for their reception that the insect becomes a mere oval brownish lump, which it is hopeless to look for among the similarly coloured little stones and earth pellets among which it lies motionless.

The distribution of colour in butterflies and moths respectively is very instructive from this point of view. The former have all their brilliant colouring on the upper surface of all four wings, while the under surface is almost always soberly coloured, and often very dark and obscure. The moths on the contrary have generally their chief colour on the hind wings only, the upper wings being of dull, sombre, and often imitative tints, and these generally conceal the hind wings when the insects are in repose. This arrangement of the colours is therefore eminently protective, because the butterfly always rests with his wings raised so as to conceal the dangerous brilliancy of his upper surface. It is probable that if we watched their habits sufficiently we should find the under surface of the wings of butterflies very frequently imitative and protective. Mr. T. W. Wood has pointed out that the little orange-tip butterfly often rests in the evening on the green and white flower heads of an umbelliferous plant, and that when observed in this position the beautiful green and white mottling of the under surface completely assimilates with the flower heads and renders the creature very difficult to be seen. It is probable that the rich dark colouring of the under side of our peacock, tortoiseshell, and red-admiral butterflies answers a similar purpose.

Two curious South American butterflies that always settle on the trunks of trees (*Gynecia dirce* and *Callizona acesta*) have the under surface curiously striped and mottled, and when viewed obliquely must closely assimilate with the appearance of the furrowed bark of many kinds of trees. But the most wonderful and undoubted case of protective resemblance in a butterfly which we have ever seen is that of the common Indian *Kallima inachis*, and its Malayan ally, *Kallima paralekta*. The upper surface of these insects is very striking and showy, as they are of a large size, and are adorned with a broad band of rich orange on a deep bluish ground. The under side is very variable in colour, so that out of fifty specimens no two can be found exactly alike, but every one of them will be of some shade of ash or brown or ochre, such as are found among dead, dry, or decaying leaves. The apex of the upper wings is produced into an acute point, a very common form in the leaves of tropical shrubs and trees, and the lower wings are also produced into a short narrow tail. Between these two points runs a dark curved line exactly representing the midrib of a leaf, and from this radiate on each side a few oblique lines, which serve to indicate the lateral veins of a leaf. These marks are more clearly seen on the outer portion of the base of the wings, and on the inner side towards the middle and apex, and it is very curious to observe how the usual marginal and transverse striæ of the group are here modified and strengthened so as to become adapted for an imitation of the venation of a leaf. We come now to a still more extraordinary part of the imitation, for we find representations of leaves in every stage of decay, variously blotched and mildewed and pierced with holes, and in many cases irregularly covered with powdery black dots gathered into patches and spots, so closely resembling the various kinds of minute fungi that grow on dead leaves that it is impossible to avoid thinking at first sight that the butterflies themselves have been attacked by real fungi!

But this resemblance, close as it is, would be of little use if the habits of the insect did not accord with it. If the butterfly sat upon leaves or upon flowers, or opened its wings so as to expose the upper surface, or exposed and moved its head and antennæ as many other butterflies do, its disguise would be of little avail. We might be sure, however, from the analogy of many other cases, that the habits of the insect are such as still further to aid its deceptive garb; but we are not obliged to make any such supposition, since the present writer has himself had the good fortune to observe scores of *Kallima paralekta*, in Sumatra, and to capture many of them, and can vouch for the accuracy of the following details. These butterflies frequent dry forests, and fly very swiftly. They were never seen to settle on a flower or a green leaf, but were many times suddenly lost sight of in a bush or tree of dead leaves. On such occasions they were generally searched for in vain, for while gazing intently at the very spot where one had disappeared, it would often suddenly dart out, and again vanish twenty or fifty yards further on. On one or two occasions the insect was detected reposing, and it could then be seen how completely it assimilates itself to the surrounding leaves. It sits on a nearly upright twig, the wings fitting closely back to back, concealing the antennæ and head, which are drawn up between their bases. The little tails of the hind wing touch the branch, and form a perfect stalk to the leaf, which is supported in its place by the claws of the middle pair of feet, which are slender and inconspicuous. The irregular outline of the wings gives exactly the perspective effect of a shrivelled leaf. We thus have size, colour, form, markings, and habits, all combining to produce a disguise which may be said to be absolutely perfect; and the protection which it affords is sufficiently indicated by the abundance of the individuals that possess it.

The Rev. Joseph Greene has called attention to the striking harmony between the colours of those British moths which are on the wing in autumn and winter, and the prevailing tints of nature at those seasons. In autumn various shades of yellow and brown prevail, and he shows that out of fifty-two species that fly at this season, no less than forty-two are of corresponding colours. *Orgyia antiqua*, *O. gonostigma*, the genera *Xanthia*, *Glœa*, and *Ennomos*, are examples. In winter grey and silvery tints prevail, and the genus *Chematobia* and several species of *Hybernia* which fly during this season are of corresponding hues. No doubt if the habits of moths in a state of nature were more closely observed, we should find many cases of special protective resemblance. A few such have already been noticed. *Agriopis aprilina*, *Acronycta psi*, and many other moths which rest during the day on the north side of the trunks of trees, can with difficulty be distinguished from the grey and green lichens that cover them. The lappet moth *(Gastropacha querci)* closely resembles both in shape and colour a brown dry leaf; and the well-known buff-tip moth when at rest is like the broken end of a lichen-covered branch. There are some of the small moths which exactly resemble the dung of birds dropped on leaves; and there are probably hosts of these resemblances which have not yet been observed, owing to the difficulty of finding many of the species in their stations of natural repose. Caterpillars are also similarly protected. Many exactly resemble in tint the leaves they feed upon; others are like little brown twigs, and many are so strangely marked or humped, that when motionless they can hardly be taken to be living creatures at all. Mr. Andrew Murray has remarked how closely the larva of the peacock moth *(Saturnia pavonia-minor)* harmonizes in its ground colour with that of the young buds of heather on which it feeds, and that the pink spots with which it is decorated correspond with the flowers and flower-buds of the same plant.

The whole order of *Orthoptera*, grasshoppers, locusts, crickets, &c., are protected by their colours harmonizing with that of the vegetation or the soil on which they live, and in no other group have we such striking examples of special resemblance. Most of the tropical *Mantidæ* and *Locustidæ* are of the exact tint of the leaves on which they habitually repose, and many of them in addition have the veining of their wings modified so as exactly to imitate that of a leaf. This is carried to the furthest possible extent in the wonderful genus, *Phyllium*, the "walking leaf," in which not only are the wings perfect imitations of leaves in every detail, but the thorax and legs are flat, dilated, and leaf-like; so that when the living insect is resting among the foliage on which it feeds, the closest observation is often unable to distinguish between the animal and the vegetable.

The whole family of the *Phasmidæ*, or spectres, to which this insect belongs, is more or less imitative, and a great number of the species are called "walking-stick insects," from their singular resemblance to twigs and branches. Some of these are a foot long and as thick as one's finger, and their whole colouring, form, rugosity, and the arrangement of the head, legs, and antennæ are such as to render them absolutely identical in appearance with dead sticks. They hang loosely about shrubs in the forest, and have the extraordinary habit of stretching out their legs unsymmetrically, so as to render the deception more complete. One of these creatures obtained by Mr. Wallace in Borneo *(Ceroxylus laceratus)* was covered over with foliaceous excrescences of a clear olive green colour, so as exactly to resemble a stick grown over by a creeping moss or jungermannia. The Dyak who brought it assured him it was grown over with moss although alive, and it was only after a most minute examination that he could convince himself it was not so.

We need not adduce any more examples to show how important are the details of form and of colouring in animals, and that their very existence may often depend upon their being by these means concealed from their enemies. This kind of protection is found apparently in every class and order, for it has been noticed wherever we can obtain sufficient knowledge of the details of an animal's life-history. It varies in degree, from the mere absence of conspicuous colour or a general harmony with the prevailing tints of nature, up to such a minute and detailed resemblance to inorganic or vegetable structures as to realise the talisman of the fairy tale, and to give its possessor the power of rendering itself invisible.—*Westminster Review*, July, 1867.

BRAZILIAN VEGETATION.

THERE is perhaps no part of the South American continent in which its botanical characteristics are better displayed, or in which more of its peculiar vegetable forms are collected together, than on the great table-land of Brazil. This tract of country, which occupies a great extent of the interior of that vast empire, and includes within it the upper courses of the rivers San Francisco, Tocantins, Araguaya, and Paraná, with their innumerable tributaries, may be described in a very general way as an undulating or moderately hilly region, open, or at least not generally wooded, and diversified by frequent ranges and groups of mountains, of no remarkable height or extent. It comprises the famous diamond district, and all, or nearly all, the gold-producing districts of Brazil. The general elevation of the table-land (at least in its eastern and best known portion, in the province of Minas Geraes) is from 2,000 to 4,000 feet above the level of the sea, and its highest mountains, it would appear, scarcely attain to 6,000 feet. It is strikingly distinguished from the tracts near the sea-coast and along the sides of the great rivers of that country, by the comparative absence of wood. It is, speaking generally, an open country, though there are frequent patches of wood—"islands of wood," as they are expressively called in the language of the country,—nestling in the sheltered hollows and recesses of the hills, and in the ravines of the mountains. These "island" woods are of much less gigantic growth than the forests near the coast, and have not their overpowering luxuriance; often they more remind us, by their general character, of our European woods, but they consist of an astonishing variety of trees. Here and there, principally on the southern parts of the table-land, we meet with groves of a strange and solemn aspect, composed entirely of the Brazilian *Araucaria*, a stately and sombre tree. It grows also, occasionally, intermixed with other trees, in the great forests on the Organ Mountains, near Rio de Janeiro; but on the table-land of Minas Geraes it grows always alone, unmixed with other trees; and its perfectly straight columnar stem, its crown of excessively long branches, spreading like the arms of a chandelier, quite bare except at their ends, which curve upwards, and the dark grey-green tint of its rigid foliage, make it a tree of very striking appearance.

This same Brazilian *Araucaria* might give rise to some curious speculations concerning the dispersion of natural types. It is so nearly akin to the well known *Araucaria imbricata*, that one can hardly help suspecting they must have come originally from the same stock; yet their native regions are now absolutely separated. The one is confined to a narrow tract at a great elevation on the Andes of Southern Chili; the other, though it has a wider latitudinal range, belongs to a lower elevation, as well as to lower latitudes and does not seem anywhere to approach the Andes. Between the regions now inhabited by the one species and the other is interposed the whole extent of the Pampas and the lowlands of Paraguay, in which neither could flourish.

The richest part, botanically, of the great table-land of Brazil is the eastern portion, comprising the diamond district and the principal gold districts of Minas Geraes. It is also the most elevated part. The surface is in general clothed with slender and rather rigid grasses, of many different kinds, growing thinly in separate tufts, not in a dense carpet, and intermixed with a wonderful variety of small slender shrubs with beautiful bright coloured flowers, many of them resembling heaths in general appearance at first sight. In some parts of the *campos* (as the open country is called) the shrubs grow larger, and form a kind of thin brushwood; and some tracts are dotted over with small low trees, standing apart like fruit trees in an orchard, which they a good deal resemble also in size and form. It would be difficult to give an idea, to those not well versed in botany,' of the variety, beauty, and interest of the vegetation of this region. Very copious detailed accounts of it are given in "Gardner's Travels," and in some papers by the same author in the "Journal of the Horticultural Society; but mere lists of names would convey little or no information to the generality of readers, and the greater part of the most characteristic forms of this vegetation are little or not at all known in cultivation in Europe. For the most part they belong to the same generic types as those which occur in the great forests in the same latitudes; but instead of appearing as giant trees or lofty climbers, those types of structure are here represented by dwarfish trees, by low slender under-shrubs, or even by herbs; and they branch out into endless minor diversities of form. A large proportion of them are specially and characteristically South American: either peculiar to that continent, or scantily represented elsewhere; others are strange and peculiar forms of widely spread types. For instance, one of the most common herbaceous plants on the *campos* of the gold district, is an *Eryngium*, strictly a congener of our well-known sea side Eryngo, or Sea Holly; but instead of the thistle-like leaves of that and of all the European *Eryngiums*, it has long, narrow, strap-shaped, parallel-veined leaves, forming a rosette at the base of the stem, and fringed throughout their length with sharp slender prickles,—leaves more like those of the pineapple family, than of that to which it belongs. A whole group of species of *Eryngium*, with leaves of this peculiar character, appears to extend through South America, from Mexico to the Rio de la Plata, and I am not aware that any such have been found in other countries.

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The Brazilian uplands lower gradually towards the south, and seem to pass without any abrupt demarcation into the grassy plains of Uruguay and La Plata. And, as in physical geography, there is no strongly marked boundary line between these two regions, so in their vegetable productions the same appears to hold good. The vegetation of the table-land melts or fades by degrees into that of the more southern plains, the distinguishing characteristics of which are perhaps rather negative than positive. The most remarkable and predominant tropical groups thin out and disappear by degrees, as we go southwards, but they are not replaced to any considerable extent by new and local forms. I speak of indigenous plants; for the vegetation of the Pampas and the banks of the Plata has been modified in an extraordinary manner by the introduction of certain plants from Europe, which have naturalized and established themselves so thoroughly, and spread so widely, as to become more predominant and conspicuous than any of the native produce of the soil. The most remarkable instances of this kind are the thistles *(Carduus Marianus* and *Cynara Cardunculus)* and the trefoils (*Trifolium repens* and *Medicago denticulata*), which cover the Pampas to a vast extent, and have been noticed by all travellers. Many other common European weeds of cultivated and waste lands are now among the most common plants on both sides of the Rio de la Plata; and some of them have been introduced within the memory of man.—*Frazer's Mag.*, July 1867.

BRITISH ARVICOLÆ OR VOLES.

THREE tolerable distinct species of these little animals have, for some time past, been known to naturalists, but the actual specific distinctions between the kinds, and the variations in the colour of the fur they assume in various localities have never yet been clearly and accurately determined. The voles are small rodent quadrupeds, nearly allied to the true *Muridæ*, but differing from them in having the head larger and rounder in proportion to their size, the ears being almost hidden in the fur, the tail being also shorter, and in the aquatic species slightly flattened at the sides. Of our British species the water vole (*Arvicola amphibia*), commnoly known as the water rat, is the largest, equalling the common brown rat (*Mus decumanus*) in size.

The fur is reddish-brown above, shading into pinkish-white beneath, and consists of a soft woolly undercoat, well fitted to resist the water, in which the creature is so frequently immersed, mingled with long shining hair, which gives a peculiarly glossy appearance to the back and sides. The incisor teeth are very large and strong, and are covered externally with a layer of hard yellow enamel. Though so thoroughly aquatic an animal in its habits, I am convinced that the water vole is often killed in considerable numbers by colonies of the house rat, which, in the summer months, migrate from the farm buildings and yards, to the banks of streams and ponds, committing great havoc among the younger fish and water-fowl, the blame of which devastation is generally placed to the credit of the poor vegetarian vole. As I have mentioned before, the common rat is as much at home by the waterside as the vole, and I have seen one of the latter pursued by a rat in the water, and vainly endeavouring to rid itself of its enemy by continued diving. The water vole usually selects river-banks or the neighbourhood of large ponds, where its favourite food the *Equisetum* or "mare's tail" grows. In these situations it forms long and winding burrows, which invariably have one outlet above the water and another beneath the surface, so that, in case of danger, it has more than one opportunity for escape. It never enters houses or barns, and shuns the vicinity of man, being a peculiarly shy animal. Its habits, however, are easily watched, and I have frequently observed them on fine balmy evenings in the summer, when the warm breeze gently rustled the waving sedges and water-flags, and bright-coloured dragon-flies hawked on gauze-like wings over the glassy pool in quest of aquatic insects, that were emerging from their pupa state towards sunset, when the moor-hen swam out in security from the tuft of reeds which had concealed her during the hotter hours of the day, followed by her brood, tiny black balls of down, that chased each other in their play, forming little glistening circlets of silvery light on the water. At these times I have seen the water-voles, engaged in foraging for food on the banks, or swimming leisurely about, taking an occasional nibble at some tempting stem, and then diving suddenly and reappearing almost immediately in the same place.

The water-vole, as far as I have observed, never hybernates during the winter months, but remains perfectly lively, laying up, however, a store of food in its burrow, in anticipation of the inclement season it evidently knows is approaching. Besides the common brown kind there is a black variety, found in some parts of England, especially in Hertfordshire and Essex. This has caused considerable difference of opinion as to whether it is a mere local variety, or possesses sufficient claims to be considered a distinct species. I have carefully examined several black and brown specimens taken in various localities, and will proceed to point out what I consider to be the actual distinction between them.

In the first place the black kind is considerably the smaller of the two, a full grown specimen of the common sort averaging thirteen inches in total length, whereas the other rarely exceeds nine; secondly, the tail is, in all cases that have come under my personal notice, considerably longer in the black vole. The head is also smaller, and the eyes larger in proportion to the size of the animal. On dissection, the only distinction I could find was that the principal intestine was considerably larger, when extended, in the black specimens. There was no difference in dentition, but the form of the skull was proportionately more lengthened in the black than the brown individuals. I have seen young specimens of both varieties, but have never met with a black specimen inhabiting the same burrows with the brown ones, but always appearing to form a small colony of their own. Indeed I believe that several species of our smaller mammalia are confounded together or imperfectly known, especially among the bats, shrews, and rodents.

The second species that comes under our notice is the field-vole (*Arvicola campestris*). This species is considerably smaller than the water-vole, seldom exceeding six or seven inches in length. In colour it is light greyish brown above, shading into bluish grey below, and has a tuft of thick hair growing on each side of the jaw, which gives it a peculiarly bluff appearance. It frequents damp pastures and low-lying fields, scarcely if ever being found in hilly localities, its place there being taken by its congener the bank vole (*Arvicola riparia*). It seems to be more prolific than the water vole, generally producing three or four litters in the season, while the others generally only have three or four young ones about the beginning of May. They are also much more destructive in their habits, often peeling the bark from young trees for food, and thus committing considerable damage.

Some years ago a great number of young holly trees were destroyed in the New Forest and in Dean Forest by these voles, the bark being entirely eaten off for a distance of several inches from the ground. Great numbers of young oaks and chestnuts were also found dead, and on being taken up it was found that the roots had been gnawed through below the surface of the ground. The most effectual method of dispersing these marauders it was found was digging a great number of holes in the ground about two feet long, eighteen inches wide, and eighteen inches deep at the bottom; at the top they were only eighteen inches long and nine inches wide, so that when the animals fell into them they were unable to escape. More than 40,000 field-voles were taken in these holes in the space of three months, irrespective of those that were taken out out of the holes by the stoats, weasels, crows, and magpies that had assembled in great numbers to assist in extirpating the little marauders. I have kept both this species and the bank-vole in confinement, and found that they rapidly became tame, allowing themselves to be freely handled, and would frequently take grains of corn from my fingers, though they would resent any liberty from a stranger with a tolerably severe bite. They are perfectly devoid of any unpleasant smell, and make interesting little pets. The third species is the above-mentioned bank-vole. This species is rather smaller than the field-vole, and differs from that animal in having the tail rather longer, and the fur of a bright reddish-brown above, shading into yellowish white beneath. It frequents drier situations than the other species, being found principally in the banks of old hedgerows and among heaps of stones. It is a very active little animal, and moves with great agility. Its habits are identical with those of the last-mentioned species.—*N.L. Austen, in Land and Water*, July 6th, 1867.

THE NATURALIST IN INDIA.

THE streams about Poonah are subject to sudden inundations, owing to the proximity of the mountains. During the hot summer months, when there is no rain, they become dried up, and, excepting small pools here and there, nothing is to be seen but the *debris* of the last storm. Frogs spawn in these situations. One species, a few inches in length, with the belly and throat pure white, is very plentiful; it basks on the sides of the pools, and takes to the water when one approaches, skipping over the pool something in the way a boy *skims* a flat stone. My attention was directed to the surface of the water, which appeared as though large drops of rain were falling on it. Having satisfied myself that this could not be the case, my next supposition was that bubbles of gas were ascending from decomposing matter at the bottom of the pool, which opinion was apparently confirmed by the bubble rising at the time the drop appeared on the surface. I discovered, however, that the water was alive with minute tadpoles. Vast numbers of these little creatures were darting to and from its surface with great rapidity. The frogs I had alarmed were poised upon the water, staring at me intently, and at the margin of the pool were hundreds of tadpoles with the caudal extremity still perfect; others, again, at a distance of some eight or ten feet, had the tail almost separated; whilst a few here and there had lost the appendage altogether, being complete frogs.

About half a mile from my bungalow there were two large hedges of prickly pear, and between them a stagnant pool. I often took up a position under the cool shade of a peepul-tree close by, and watched the habits of the feathered tribe at mid-day. On one occasion, having shot a sun-bird, it fell on the margin of the pool, when some animal jumped from the muddy water, seized it, and instantly disappeared with its prey. A short time afterwards a large green frog appeared on the surface. I shot it, and discovered the bird in its mouth.

The purple honey-sucker of Jerdon, the beautiful blue-wing sun-bird (*Arachnechthra asiatica*, Lath.), is common, and nothing can exceed the grace and elegance of its congener, the Ceylon sun-bird (*Leptocoma zeylonica*). This exquisite little creature sports round the top of the prickly pear, sucking the nectar from its flowers like a humming-bird. Neither species, however, subsists altogether on honey, for flies and minute insects are frequently found in their gizzards. The brilliant green spot on the wing of the male is wanting in the female.

The gaudy lesser crimson-breasted flycatcher (*Pericrocotus peregrinus*) is a tenant of the woods and hedges. Sometimes flocks of males, at other times females only, are observed; the rich and beautiful plumage of the former is very striking; insects and larvæ constitute its favourite food. The shrill, clamorous cry of the koel, or black cuckoo (*Eudynamys orientalis*) was constantly heard in woods and groves; it feeds on fruit. I shot a specimen of a young male European cuckoo (*Cuculus canorus*) on the 16th of October.

At their residence near Poonah the ex-Amirs of Scinde had several fine goshawks, trained for falconry; the species has been shot on the Nepal mountains and Neilgherries. Trained Bhyri falcons (*Falco jugger*) are sold at Poonah by the natives, and fetch high prices. They say these birds inhabit the mountains and woody parts of the district; but there is no more handsome falcon than the teesa (*Poliornis teesa*); its fine, clear, light-coloured eye, and in fact the whole appearance of the bird, indicates grace and strength of wing. In the stomach of a female I found a lizard four inches in length.

Among the many discomforts Europeans have to endure in the East are myriads of fleas, mosquitoes, snakes, centipedes, scorpions, etc., etc., which not only infest gardens, but penetrate into the interior of houses, especially at night. No sooner is the cloth spread than hundreds of beetles, attracted by the light of the candles, dash recklessly into the flame, and fall disabled on the table, intruding themselves into every dish; crickets chirp among the beams overhead, and the whole apartment resounds with the noise and buzz of insect-life. Nor is the scene without very different, though occasionally more attractive; for swarms of fire-flies assemble round the bushes, and with the lucid beam of their tiny lamps illumine the gloom of the tropical night.

On one occasion I was awoke by my servant pursuing a snake across by bedroom floor; he killed it at my bedside. It was a species very common about Poonah, of a greenish-black colour, and about two feet in length, with numerous white spots on its upper surface.

Snake-skins (so entire that even the covering of the eye is retained) were often found under the floor-matting; and a species, white-spotted on the back and sides of the body and about five feet in length, abounds in gardens; on that account one is often obliged to ride on horseback after nightfall, when numbers may be seen crawling about in the roads and gardens, searching for frogs, on which they principally feed. There is a green species, two-and-a-half feet in length, said by the natives to be very venomous. My attention was directed to a circumscribed swelling in the centre of the body of one of these serpents, which on dissection proved to be a frog, fully three times as broad as any other part of the snake's body. Two minute wounds on the frog's back were the only marks of violence discernible.

The cobra di capella is tamed, and taught to dance to the pan-pipe-like sounds of a sort of flageolet. It is said to be plentiful in the cactus hedges, which seem to be a "rendezvous" for all kinds of snakes and vermin. One sultry day, while seated under an acacia tree, I heard a hissing sound behind me, and turning, saw a cobra close by, with raised head and inflated hood, knocking its nose against the stem of a cactus. One of the first injunctions a native servant gives his newly-arrived master is, "*always to shake his boots well before putting them on*," scorpions being apt to take up their abode in the toe!

A green lizard is common in gardens, and on the thatch of bungalows: it preys on scorpions, especially a small black species, abundant beneath stones and the matting of rooms. Centipedes of large size are very plentiful.

The moongus, or grey ichneumon (*Herpestes griseus*), is found in this district, and frequently domesticated. It is exceedingly useful in destroying centipedes and scorpions, but I have never seen it attack serpents; and the story regarding the antidote it obtains for snake-bites in the root of a certain plant called moonguswail, like most Indian tales of that description, is perfectly mythical.

The bandy-coot or hog-rat (*Mus giganteus*) was frequently seen in our houses. This animal is very destructive, and creates much disturbance at night. Sometimes it coursed across the canvas covering of our ceiling—a signal always for "drawn swords," and a *prod* through the "dungaree," together with the pleasing uncertainty as to whether you are transfixing a ghous (as the Mahrattas call it) or a mangur (*Felis bengalensis*), a species of wild cat which prowls about at night, and hides during the day in hedges, or under the thatch of bungalows.

Several species of chameleon are abundant: they frequent bushy places, and are seen basking on the stems of trees; while geckoes are common on the walls of houses. Tigers are found on the mountains and in the jungles. Not far from Kirkee is the village of Maun, where, during midsummer, both the common and jack snipe are abundant in the rice-fields. They arrive about the beginning of November, when also a few painted snipe may be obtained.

Maun is situate close to a range of mountains covered with low dense jungle, extending some distance into the plain, which is studded with villages, rice-fields and gardens, separated by ravines and large tracts of waste and barren country. A dense jungle to the north of the village was said to have been the haunt of a man-eating tiger for some time previous to our visit, and we found the carcase of a bullock lying in a chilli field, not a stone's throw from the village. On both sides of the animal's neck were deep wounds caused by the tiger's teeth, and on the shoulder a long gash, where the claw had ploughed through the skin; the whole of the flesh on the belly and flanks was torn away, the stomach and entrails lying on the ground, where we could see distinct traces of a scuffle, and the footprints of a very large tiger. Pitching our tent within range, we sat up that night, expecting to get a shot at the marauder, as the moon was shining brightly; but after a fruitless vigil, and growing drowsy, I went to bed, and had scarcely been asleep an hour when my servant called me to say the tiger had arrived, and was carrying off the carcase. It was too late, however, as we were just in time to see him disappear in the cover with his prey. The following morning all that remained of the bullock was the skull, and a few pieces of the larger bones. A week afterwards I heard that the same tiger had killed another bullock near a village some ten miles distant.

The kestrel (*Tinnunculus alaudarius*), and also the sparrow hawk (*Accipiter virgatus*), are common. The former may be observed hovering over the plains, and at dusk, not unfrequently in numbers, perched on stones and tufts of grass. Both prey extensively on mice, lizards, and beetles. The latter hawk is trained for quail-hunting. The broad-tailed flycatcher (*Rhipidura fuscoventris*) is plentiful in gardens and wooded localities. It is not shy, and for its size bold and fearless, and will attack birds much larger than itself. The song of the male consists of a few loud and pleasing notes, uttered while the little creature is dancing along the branch with tail and wings expanded like a fan.

The common kingfisher (*Alcedo bengalensis*, Gmel.), the black and white species (*Ceryle rudis*), and the Indian kingfisher (*Halcyon fuscus*, Bodd.), are often observed. The first is common in rice-fields, streams, and river banks; the two latter are not so plentiful; the Indian kingfisher is a tenant of gardens and pools. On the broad tops of peepul, acacia, and mango trees, the lark-heeled cuckoo or Malabar crow (*Centropus rufipennis*, Illig.) perches; grasshoppers and coleopterous insects constitute its favourite food. These birds startle one, while passing under a tree, by the flapping of their large fan-shaped wings; their flight is a sort of sailing motion, which, with the expansive tail, makes them appear much larger than they are in reality. Frequenting like situations may often be seen the beautiful Indian roller (*Coracias indica*), it sports from one tree-top to another with a peculiar zig-zag flight; butterflies and large insects are its favourite food, and are caught on wing. Flocks of the black-headed finch (*Emberiza melanocephala*, Sykes) are common; it is dispersed over the fields during harvest, but disappears soon afterwards. Rock pigeons (*Columba livia*) congregate in the deep wells, in the sides of which they breed. The natives capture them by suddenly throwing a net over the mouth of the well. There is no variety in the wild bird, and although the tame pigeons feed in the fields, the two do not appear to associate. By the sides of hedges, in gardens and way-sides, the Senegal dove (*Columba senegalensis*) is frequently observed. It passes the greater part of the day on the ground, but is often seen likewise on trees. In dissecting and preparing the skins of this species (in fact Columbidæ in general), great care should be taken to remove the fat from the skin of the back and sides, else the feathers will be sure to drop out.

The tailor-bird (*Orthotomus longicauda*), with its curiously-fashioned nest, displaying most marvellous skill and care, is plentiful in groves and gardens, where it may be seen flitting among the dense foliage, emitting its loud cry, resembling that of the mina. The tailor-bird is by no means shy or easily frightened; on the contrary, it is an inquisitive little fellow. I recollect once, when seated under a tree, employed in skinning a bird, one came within a yard of me, and attentively watched the proceeding. It has a droll way of inspecting objects *sideways*, jerking its tail unceasingly when moving. To those familiar with its habits it will not appear surprising that this strange little creature should be the architect of that wonderful nest, formed of cotton, wool, hair, &c., enclosed between leaves, beautifully *sewn* together with vegetable fibre. The young resemble their parents, except in length of tail; also the rufous on the head is not so clear.

Of all rapacious birds the govind-kite is the most useful and abundant; wherever offal exists there this bird is to be found, hovering over the butcher's shop, the kitchen, or the barrack—now leisurely sailing in circles—now darting like an arrow upon its prey, which it devours while on the wing, uttering a clear shrill cry whenever a companion disputes its possession. Its boldness is almost ludicrous. Once, when a servant was bringing mutton-chops from the cook-house to our mess, one of these birds darted upon the dish, and tore away the contents in its talons. The plumage of this species is subject to considerable variety: some are very dark (these I take to be the old birds), others have the under parts light rufous, darkly lined.

The govind-kite, Egyptian vulture, crow, Indian jackdaw, and mina, may justly be termed "*the great scavengers of India.*" What would its large cities be without these useful birds? and lean and degraded as the pariah dog is, abused and cowed by the natives, still he clings to man, and picks up a scanty meal on the dung-hill, or feasts with the jackal. From constant ill-treatment he has become the very picture of abject misery, crouching at the sound of the human voice; yet, from some strange instinct, unsolicited he protects the dwelling of the native, and the midnight robber would find it hard indeed to pass his post unchallenged.

The hoopoe (*Upupa epops*) is very common on lawns and in fields. I have been informed that the black-headed bustard (*Otis nigriceps*) was at one time common in this district. It is now seldom met with, having been so much sought after by sportsmen; one specimen was brought to me from the mountains near Poonah with its eyelids sewn together to prevent it running away! The naturalist is likely to be led into error in studying the appearance and habits of the dial-bird (*Copsychus saularis*). The more sombre plumage of the female (which is seldom seen with the male, except during the breeding season) has deceived many. The song of this species is rich and sweet, and frequently imitates the notes of other birds. In habits familiar, it is a common tenant of the gardens, where it pours forth its welcome notes in the afternoon or early morning, and like its rival *redbreast*, sings a bar, and then waits a short time for another individual to reply. This species is the "*nightingale*" of English residents: among flocks of mina birds (*Acridotheres tristis*) may often be seen numbers of the roseate pastor (*Pastor roseus*). The smaller size, peculiar sailing flight, and more pointed wings, will distinguish the latter at a distance.

The rain-quail (*Coturnix coromandelica*) is plentiful during the monsoon. I have shot it in lucerne fields close to my house, and the bush-quail in low jungle near the mountains. We have the Indian golden oriole in woods and groves. It is shy and difficult of approach. The nest, which is placed in the fork of a tree, is formed of dry grass, with a finer description in the interior. The large purse-shaped nest of the weaver-bird (*Ploceus baya*) would fall an easy prey to its enemies, did not the little architect, with surprising intelligence, place it in situations not easily accessible; hence several may be seen suspended from the tips of branches overhanging deep wells, or on the topmost boughs of acacia and thorny trees. The weaver-bird builds in societies, and is docile and familiar in its habits. The common king-crow (*Dicrurus macrocercus*) is often seen on the backs of cattle.

The Egyptian vulture is a native of Eastern Europe, Asia, and Africa. On the temperate regions of the Himalayas it follows man wherever he congregates; and on the plains of India its gaunt forbidding figure is seen stalking among all animal refuse. It is the smallest of the tribe found in the East; its total length seldom exceeding twenty-six inches. In the adult the skin of the head and front of the neck is bare, yellow and shrivelled, giving the animal a melancholy, poverty-stricken appearance. The general colour of the plumage is white, except the quills and their coverts, which are black; the iris is red in the old bird, but brown in the young, which also have the naked part about the head of a leaden colour until the second year. There is great diversity of plumage, from the brownish-black of the young bird to the white of the adult; this latter is attained at the third moult. The habits of this species are strictly domestic. It is usually met with in the filthiest parts of towns and military cantonments. As soon as dinner is announced by the bugle-sound in barracks, Egyptian vultures and kites may be seen hastening towards the scene, which soon assumes a lively aspect from the numbers and activity of the kites, as they dart like arrows on the bones and refuse; while others, with head erect, lifting their legs (much after the manner of rooks), are silently devouring whatever comes in their way. Now and then a vulture in the act of bolting a piece of flesh has to relinquish the morsel to his more nimble companion, whose sharp talons soon tear it off, and he is seen devouring the prize as he sails away. The two species often roost together, and seem to agree very well except at feeding-time. Flocks of both accompany troops for hundreds of miles, and regularly at daybreak, as the new camp is forming, they may be seen approaching from the direction of the previous day's halt.—*Wanderings of a Naturalist in India.* By A. L. Adams, M.D. Edinburgh: Edmondston & Douglas.

AMERICAN PARASITIC PLANTS.

TO persons familiar with the principles of cultivation, and with more or less knowledge of our native plants, the fact that there are tribes of plants in other regions of the earth, that, without any attachment whatever to the soil, grow and produce flowers of the most novel form and brilliancy of colours, seems wonderful in the extreme. Such are the Epiphytes, or air-plants of the tropics, whose seeds, lodging on the branches of living or decayed trees, or even upon the very rocks, readily vegetate, and draw from the surrounding atmosphere the constituents of their growth.

This is accomplished chiefly through their roots, as in other plants; and as they are found to increase with much greater luxuriance in the recesses of the forest, by the banks of streams, in a sultry, humid atmosphere, we see less difficulty in comprehending the possibilities of their growth and the economy of their being; indeed, their nature is now so well understood, that they are cultivated with ease in our conservatories.

We do not, however, intend to write of air-plants, as our country produces none; but we have, among our native plants, those whose methods of growth are perhaps scarcely less novel and wonderful; such as our parasites, which derive their nourishment from other living plants to which they adhere—depending upon the leaves and roots of such plants for the necessary contact with the atmosphere and the soil.

The name Parasite is of great significance, for such plants are robbers in the fullest sense, and live solely at the expense of their neighbours.

The most marked example in this region of such anomalous plants is the Dodder. Our species, the Cuscuta Gronovii (*C. umbrosa* Torrey, or *C. vulgivaga* Englemann) is as strongly marked, and more widely distributed than either of the other American species.

The genus Cuscuta has generally been appended to the Convolvulaceæ, or the Convolvulus tribe, which consists chiefly of twining plants, and have regular monopetalous pentandrous corollos, and two to four-celled capsules, with large seeds. This order is well represented by the Cypress vine and the Morning-glory.

The cuscutas have no leaves, for these plants need none; all the necessary functions of leaves, as has been stated, being performed by the leaves of other plants on which they grow. They have, however, a few minute scales in alternate succession, which are in place of leaves, and from their axils spring the branches. Although so anomalous as these plants are supposed to be, yet the right of being perfect plants must be conceded them, and they are properly assigned a place with other Convolvuli.

Eight or nine species grow freely in this country, two of which are found in New England.

C. epilinum, or the Flax Dodder of the old world, mentioned by Gerard and more ancient writers, is naturalized here to some extent. It is said to grow only upon flax, to which it is a great pest, spoiling large quantities. It was noticed by Dr. Cutler as being destructive in his time; but as that useful plant is now seldom cultivated in this region, the Flax Dodder is but rarely detected. A monograph of the American species, prepared by Dr. George Englemann, of St. Louis, can be found in Silliman's Journal, vols. 43, p. 333, and 45, p. 73.

Under the name of *C. Americana*, the various native species were for a long time confounded. The botanical text-books tells us that the seeds of this strange plant germinate in the earth in the ordinary manner, throwing downward a root into the soil, by which for a short time the tender plantlet is sustained, until it elongates its thread-like stem sufficiently to reach some foster-plant, around which it immediately twines, and into whose tender bark it thrusts aerial roots, which feed upon its juices; after which, no longer needing attachment to the soil, the primitive root withers away.

After many times plucking the cord-like stems of this plant, and noticing the decisive development of its flowers and seed (for they are as perfect as upon leaf-clad plants), we resolved to prove, with our own eyes, its double nature and singular method of growth. Accordingly we procured some perfect seed of which the wild plant produces an abundance, and of a size by no means diminutive, and planted them in a bed with other seeds, in small rows, each appropriately tallied, and all designed for transplanting, in due time, to suitable places in the border. In a very few days after planting, the Cuscuta-seed uncoiled its feeble embryo, and erected its simple yellow thread into the sunshine and air; but while we waited for further developments, the spring winds and the warm suns of noon quickly withered them away.

Thus our first attempt at cultivation utterly failed, and solely for the want of some older plants in sufficient proximity for the young seedlings to cling to, but which at the time escaped our reflection. Months elapsed before the experiment was again tried, which was done within doors and in mid-winter with perfect success. The seed readily germinated as before, and when the young plants were about an inch in height, they were taken separately from the earth, and placed here and there on the axils of the leaves of plants near at hand, such as Fuschias, Geraniums, and sundry hanging plants.

With the instincts of their nature (if it be pardonable to use that term), they in a few days attached themselves to these plants, particularly to the Fuschias; and as the spring advanced, they grew with great luxuriance and flowered freely, but, as might be supposed, to the manifest detriment of the plants about which they twined. This, however, was overlooked in the satisfaction arising from success; for had their yellow stems been gold, and their clusters of flowers pearls, the satisfaction would hardly have been greater. Those placed on the hanging plants, although they adhered, made but feeble growth. One seedling placed upon a plant of *Dielytra spectabilis* did not twine or extend itself with much freedom, but, taking a turn or two near the extremity of one of the branches, it there expended its strength in perfecting a large conglomerate cluster of one hundred or more bells of unusual size and purity of colour. In the process of transplanting from the earth to their aerial abode, we at first attempted to convey a ball of earth with each seedling, but this was soon found to be worse than useless.—*American Naturalist*, June.

JUPITER.

JUPITER is the largest planet of our system, at the mean distance of 490 millions of miles from the sun. It includes within its orbit all the planets that have yet been described, within its mighty circumference of 3110 millions of miles, around which it travels in 11 years 315 days.

Jupiter revolves on his axis in 9 hours and nearly 57 minutes, hence his day is only about 5 hours long. His diameter is 89,000 miles, hence his circumference is 287,600 miles.

The equatorial portions of Jupiter move round the axis of the planet with a velocity of 28,000 miles an hour, which is 3,000 miles an hour more than our globe moves on its axis. The surface of Jupiter contains 24,884 millions of square miles; and hence, his magnitude is nearly fourteen hundred times that of our earth. His rate of motion in his orbit is about 30,000 miles an hour, carrying along with him a splendid atmosphere, and four moons larger than ours, to adorn his nocturnal firmament; and hence, display a scene of grandeur, wisdom, and omnipotence, worthy of the infinite goodness and perfection of its Creator. We can also see another trait of wisdom in creative intelligence in placing the inclination of Jupiter's axis within little more than three degrees from the perpendicular; and, therefore, there can only be a very slight variation in his seasons; indeed, one might almost term his years a perpetual summer, in which, day by day—

> The smiles of morning gild the ponderous globe.

Had Jupiter's axis been inclined as much as that of our earth, his polar regions would have remained alternately in darkness for six years without intermission.

The intensity of solar light on the planet Jupiter is only one twenty-seventh of that of the earth; and hence, the mean apparent diameter of the sun, as seen from Jupiter, is only one-fifth of the size as seen from the earth; but if the intensity of solar light in Jupiter be increased by reflection, by any substances connected with this noble planet, or if the inhabitants have the pupils of their eyes enlarged in proportion to the diminution of solar light, all objects around them may appear even with greater splendour than those do in our earth.

Astronomers have not determined with this planet, as they have done with Mars, that it has an atmosphere of any great extent, yet it may be furnished with an appendage which ministers comfort and happiness to the inhabitants of so august a world, equally as our atmosphere does to the inhabitants of this, our earth; and hence, admitting Jupiter to be a habitable world, and to be clothed with vegetation, after the manner of our earth, ideas which the mind of every rational being cannot fail to entertain, what beauties can we not fancy may adorn so magnificent a globe, enjoying an almost perpetual summer—plants, from the "hyssop on the wall," to others that may far outstrip the cedars of Lebanon in size and grandeur—fruits, whose sweetness may surpass even our ideal nature—and what must be the nature and characteristic of the inhabitants of this noble planet, in majesty and dignity, who are created to dwell in so magnificent an abode? The celestial scenery from Jupiter must be sublimely grand.

As Jupiter reflects to the atmosphere of our earth a combination of the red and the yellow rays of light (oxygen and nitrogen), we find the orange-coloured ray producing, like the red ray, heat; and hence, with Jupiter's aspects, we may safely contemplate increased temperature, fine serene weather, excepting when he is contending with antagonistic influences; then we may look for violent thunder-storms in summer—strong winds, mild air, and very large rocky clouds in spring—large wool-pack clouds in summer and autumn, and mild air, for the season, in winter; but if Jupiter's aspects be combined with those of Saturn or Herschel, in the winter we may have severe frosts. In verification of these facts, we will glance at Jupiter's aspects in the wet year, 1861. Out of twenty-five aspects, solar, lunar, and mutual, the temperature rose in twenty-three of them 115 degrees, and fell on only two aspects 7 degrees, leaving 115—7=108 degrees in favour of Jupiter's calorific properties, making about 4½ degrees rise on the average of his aspects. Rain fell on only five of Jupiter's twenty-five aspects, amounting altogether to three-tenths of an inch during the year, showing that Jupiter is of itself a heatmaking as well as a dry planet. When, therefore, agriculturists see that Jupiter is about to form an aspect, either with the sun, moon, or Mars, he may calculate on fine dry weather for any operations he may have in hand, or would wish to commence. The pleasure-taker may arrange for his pic-nic parties without the fear of being drenched with torrents of rain, except when Jupiter is in aspect with Venus or Saturn, or is passing from an aspect of Mars to one of Venus, Saturn, Herschel, or even the far-distant Neptune, then he may not be surprised if he be suddenly overtaken by a thunder-storm, because opposite currents of electricity will be excited in the earth's atmosphere, on the earth's passing from one angle with Jupiter to a similar angle with Saturn, which may be termed a transition period; so that when the opposite poles of such a celestial battery are brought into contact, either by the lunar rays or some counter current of electricity produced in the upper strata of the atmosphere, which communicating its influence to the lower strata of the clouds, then a storm of considerable magnitude will very probably be the result.

Jupiter's solar aspects, when not connected with any other aspect, are generally attended by tremendous rocky cumulus clouds, highly charged with positive electricity. In the gigantic cumuli being carried off by induction, a grand display of thunder and lightning, with dashing rain, frequently takes place, and sometimes hail.—*The Science of the Weather.* Glasgow: Laidlaw.

THE NORWEGIAN FERNS.

Polypodium vulgare.—Is common on stony and rocky places in various parts as far north as East Finmark.

P. phegopteris.—Common in all Norwegian woods. It is to be seen in all the woods round Christiania, and even near Alten and Hammerfest in Finmark.

P. dryopteris.—Is common near Christiania, Bergen, and Trondhjem. It is found in some parts of Finmark.

P. robertianum.—Found in rocky limestone soils from Christiania up to Trondhjem, but no farther north than the last-mentioned town.

P. rœticum.—Common in all mountain regions—up as high as East Finmark. It is found upwards of 4000 feet above the level of the sea.

Woodsia Ilvensis.—Grows in the higher mountain regions from Christiansand up to Finmark. Although scattered over the whole country, it is by no means common, and is always to be met with in the moist crevices of rocks.

W. hyperborea.—The remarks on the preceding are applicable to this species.

L. clavatum.—Is found on mountain morasses in Norway, especially in Finmark. It is said that the Lapps adorn their children's heads with chaplets made from this species, and that the spikes of the plants, projecting on all sides, remind those singular little people of fairies.

L. annotinum.—This rare fern is found in many of the pine forests of Norway.

L. selago.—Is supposed to possess medicinal virtues, and being a powerful irritant, it is used in Sweden and Norway as a decoction wherewith to get rid of vermin in cattle. It is pretty common in this country.

Ophioglossum vulgatum.—This small fern is found in moist places on the shores of some of the Norwegian fjords.

Botrychium rutaceum.—Is by no means common, but we have met with it near Christiania; and a Norwegian friend informs us that he has seen it in Gudbrandsdal.

B. lunaria.—More common than the preceding, and is sparsely scattered throughout this country, even in the extreme north, where the soil is sandy.

Blechnum spicant.—Common in some parts of the west of Norway, and is also found in Finmark.

Cystopteris fragilis.—The brittle bladder fern is pretty common in all damp places in the Norwegian fjelds.

C. montana.—Common in wet places on the Dovre fjeld.

C. crenata.—This rare fern is said to be met with in only one or two places in Gudbrandsdal.

C. regia.—Found in the alpine regions in the south of Norway. We have seen it at Bærum, 7 English miles from Christiania.

Lastrea thelypteris.—Grows in some marshy places. We have seen it near Christiania.

Polystichum filix mas.—Common in shady places in all parts, even in East Finmark.

P. cristatum.—Is not common, but we have found it in sheltered places near Christiania.

P. dilitatum.—Common in all Norwegian forests.

Aspidium lonchitis.—Is to be found in rocky places as high up as the birch grows in the Dovre-fjeld.

A. angulare.—This rare species is to be found near Christiania, Bergen, and Trondhjem. The last mentioned locality seems to be its limit northwards.

A. adiantum-nigrum.—Grows in sandy and rocky spots on the south-west coast of Norway.

A. filix-fœmina.—Common in moist places in the woods in all parts, even in East Finmark.

A. trichomanes.—Common in sheltered places among rocks up to the southern parts of Nordland.

A. viride.—Grows in mountain districts among rocks as far north as the southern parts of Finmark.

A. ruta-muraria.—This diminutive plant grows on old walls, and in the fissures of rocks, near Christiania, Bergen, an Alten in Finmark.

A. septentrionale.—Is common throughout this country in all rocky and stony places.

A. germanicum.—Is a rare plant in Norway. We have found it on Næsodon, a small peninsula running out into the fjord near Christiania. It also grows near Bergen and Trondhjem.

Pteris aquilina.—Is found in rocky places as far north as Nordland.

Adiantum capillus-veneris.—Only to be met with in one or two sheltered places in the extreme south of Norway.

Allosorus crispus.—The mountain parsley grows on all rocky places on the west coast of Norway and in Thelemarken.

Hymenophyllum wilsoni.—Found on moist ground among rocks near Christiansand and Bergen.

Scolopendrium vulgare.—This fern has only been recently discovered in Norway. It grows on old walls.

Equisetum variegatum.—The variegated rough horsetail may be placed among the Norwegian ferns. It is found by some of the rivers and lakes of this country.—*Black's Guide to Norway.*

INDIAN SPIDERS AND BEETLES.

A friend has kindly undertaken to send to your office a small box containing specimens of spiders and beetles. I shall feel obliged if you will name the specimens for me. The spiders are called by the natives "jeramungalum," and are said to be poisonous. They appear during the months of February, March, and April. I have never seen them except at night, when they appear on the walls of the house, or in the verandah. They run at such a pace that it requires the greatest sharpness and activity to secure them. If one comes on the clothes of a native servant, he (the servant, not the spider) rushes away and literally tears the coat off, without waiting to unbutton or untie it. This year I have caught between sixty and eighty, and I have made every one bite me on the soft part of the arm, without any bad effects. The bite is simply painful from the strength of the nippers, but I never could find the trace of any secretion, either on the bitten part or on the nippers, when examined through a Stanhope lens. My friend Captain Mitchell, superintendent of the Madras Museum, having told me of two cases of the bite of this spider slightly poisoning the parties bitten, and one of the gentlemen being a personal friend, I made him give me full particulars. He was at tea in the morning (by candle-light, I think), and felt a bite on his leg. He struck the place with his open hand, and undressing found the remains of the spider which he had "squashed." He described the pain, such as he had no doubt was caused by poison, and not from mere nipping. He left his tea and rode away, not getting rid of the pain for two or three hours. You will doubtless remark peculiar paddle-shaped white appendages, twelve of which are on the last pair of legs next the body. I can form no idea of their probable use. The gold-backed beetles will, I have no doubt, reach you in full beauty. They were found on the leaves of a very common creeper, called in Hindustani bysibalka puttah; in Tamil, oonang yela, and in Telegoo, meendray bukoo. I regret to say I do not know the botanical name. However, I have sent you two leaves of the plant for identification. I have had these beetles for some time in a breeding-cage. A few died. When put in spirits immediately after death they do not change colour; but if dried the golden colour becomes black. Whilst alive they vary in colour from a light bronze to the palest gold. I know very little about beetles, and have not had time since I got the "gold-backs" to examine them minutely with a lens: but, from their very peculiar ladybird-like flight, which is, I suppose, familiar to most, I am inclined to think they belong to that group of beetles. All I have sent you were put into spirit alive.—SMOOTHBORE (Madras, May 10, 1867). [The spiders forwarded belong to a genus now known as Solfuga, but which was formerly described under the name of Galeodes. The particular species forwarded was carefully described by Capt. Thos. Hutton, in the "Journal of the Royal Asiatic Society," under the name of Galeodes vorax. The captain stated that when he spread out on the ground a large white sheet with a lantern in the centre to attract insects, he observed several of these enormous spiders appear and take their stations at a distance from each other, and that the moment an insect, attracted by the light, settled on the sheet, it was snapped up by them and spirited away before he could effect its capture. He described them as having a most voracious appetite, and as often fighting with, and even devouring, one another. In their habits they are nocturnal, being concealed during the day in crevices under stones. They make no web, but secure their prey by darting on it with great rapidity. Capt. Hutton captured one alive, which he placed in a bottle with some earth. In this the spider excavated a cave, in which she deposited fifty ova as large as mustard seeds. These hatched into young that were most tenderly cared for by the parent, who guarded the hole. This animal killed and devoured a lizard whose extreme length was five inches, seizing it behind the shoulder and with her two pairs of jaws rapidly eating her way into its vitals; after eating this meal the spider was lethargic for a fortnight. The same spider seized a young sparrow by the thigh and sawed the limb off, afterwards cutting off the head. The existence of the triangular processes on the hinder legs were noticed by the captain; their use is not known. One singular circumstance was also noticed, that if in the pursuit of their food two came into contact, the one taken at a disadvantage is killed by the other almost without resistance; but that if two approach and grapple, a wrestling match takes place before the weaker "caves in" and resigns himself to his fate. In Egypt there is a still larger species, known as the Solfuga araneoides. The beautiful beetles forwarded are specimens of the family Cassidæ, the particular species being Aspidomorpha crucis. In some parts of India the females string them on thread and use them as ornaments. Some time since Mr. F. Smith exhibited a living specimen at the meeting of the Entomological Society in London. The family is widely distributed, different species being found in various parts of Africa, New Holland, Java, and India.—ED.]—*Field*, July 13.

THE LIMPET.

IN "Edible Molluscs of Great Britain" we read the following:—The shell is oval and conical in shape, apex central, or nearly so, strong sometimes with ribs diverging from the apex to the margin, and sometimes quite smooth. Colours various, pale greyish-yellow or greenish-brown, inside generally, showing the same colour through, and the markings of the ribs distinctly towards the margin; the inside of the apex an opaque bluish-white, and the whole slightly polished.

The common limpet is found distributed all round our coasts, where it is greatly valued as bait by fishermen. At low tide, limpets may be collected in great numbers from the rocks and boulders. Some are seen safely ensconced in holes or depressions made by means of the muscular action of their foot or disk, which is the width of the shell; others are seen creeping about in search of fresh resting-places, or food, with their tentacles slightly protruding beyond the shell, till alarmed by some touch or otherwise; and they adhere with wonderful strength to the rocks.

On the Devonshire coast I have found them very large, and worn quite smooth; some specimens measuring as much as eight inches in circumference.

In many places limpets are used for food, especially on the Continent, where they are oftener eaten than the periwinkle. At Naples they make them into soup, and I am told it is an excellent dish. At Eastbourne we have often seen the Irish reapers come down to the shore and eat the limpets raw, which they had knocked off the rocks with their knives. The poorer classes at Eastbourne also eat them constantly, the children collecting them at low tide from the rocks. At Plymouth they gather great numbers of them, especially from the breakwater, as well as in the Isle of Man, where they are known by the name of "flitters;" and in Scotland the juice of these shell-fishes is mixed with oatmeal. In the Feroe Isles they call them "flia;" and in "Life in Normandy" we are told "that limpets are constantly eaten by the poor."

The Patellidæ were also among the shellfish eaten by the ancients. It is a curious fact, and one which is puzzling to archæologists, that limpet shells should be found in such abundance in cromlechs, both in the Channel Islands and in Brittany, surrounding the remains of the dead, often covering the bones, skulls, &c., to the depth of 2 ft. and 3 ft. in thickness. They are found not only in the earliest deposits, but also amongst the more recent. Necklaces of limpets and other shells, strung together on fibre or sinews, are found in early British graves. Limpet shells are also used for mortar.

In the island of Herm, near Guernsey, poultry are fed on Patella vulgata ; but it is said that they will not touch Patella athletica, which is also considered too tough for bait.

Sea-birds feed on the Patella, and Mr. Gatcombe, in *The Field*, August, 1863, mentions having once taken from the gullet of an oyster-catcher upwards of thirty limpets. He also adds an account of a curious occurrence which took place on the Plymouth breakwater some time ago: One of the workmen employed on the breakwater observed a sand-piper fluttering in a peculiar manner, and discovered on approaching it that it had been made prisoner by a limpet. It would appear that, in running about in search of food, the bird's toe had accidentally got under a limpet, which, suddenly closing to the rock, held it fast until the man came up, who with his knife removed the limpet, and released the bird.

The French call this shell *Lépas Patelle*, *Jambe*, *Œil de Bouc*, and *Bernicle;* the Germans, *Schüsselmuschel: Napfmuschel*, or *Napfschnecke;* the Spaniards, *Diampa;* the Portuguese, *Lopa;* and the Italians, *Lepade;* and in Cornwall, limpet shells are called *Crogans.*

WOODPECKERS.

Mr. Sterland writing from Sherwood to the *Field*, says :—"The woodpeckers are peculiarly inhabitants of the forest, and that handsome species, the green woodpecker (Picus viridis), is very abundant, our old, decaying oaks being a favourite resort, and furnishing them with an ample supply of food. The light, sandy forest soil is greatly frequented by ants, and here you are sure to meet with the green woodpecker. It is a shy species, and its white eye wears a peculiarly wild expression, with its singular cry, heard in the depths of the woods, has something very unearthly and startling about it. It is generally uttered while it is on the wing, making its odd, festooning flight from tree to tree, but not invariably so, as I have heard it both when clinging to a tree and when on the ground. The latter situation is only frequented where there are anthills, when it willingly leaves its strongholds, the trees, to search for its favourite food.

"Their motions on the trees, for which they are so admirably fitted, are well worth watching. I never saw them by any chance perch on the upper side of a bough, but it is fond of clinging to the under side, where during the day insects chiefly congregate. It is on the perpendicular trunk, however, that it is most at home. Commencing at the base it pursues a spiral course to the top, prying into every chink and crevice, tapping here and there with vigorous and rapid strokes to alarm its insect prey.

"I have remarked previously that nearly all the old oaks in the forest have suffered the loss of their tops by the agency of wind and lightning, aided by natural decay. Sometimes you may see the upper portion of one of these venerable trunks quite denuded of its bark, and riven with many fissures, though the tree is all the while in vigorous growth. On some of these I have often noticed the green woodpecker practise a singular feat. Placing its bill in one of the long cracks I have mentioned, it produces, by an exceedingly rapid vibratory motion, a loud crashing noise, as if the tree was violently rent from top to bottom. I have heard it when the sound was so loud and sudden that the woods rang again. For a long time I was at a loss to know how it was produced, but I one day witnessed the process, and have seen it several times since. It would effectually rouse up all the insects, for it seemed as if the tree quivered from top to bottom.

"Montagu mentions the jarring sound made by this species, but imagines it to be the call of both sexes to each other. With this I do not agree, but think from frequent observation that it is solely for the purpose of procuring food.

"The hole in which the eggs are laid is generally with us hewn through the sound outer portion of the trunk, until at a few inches deep the decaying wood is reached, in which the hollow for the eggs is formed, for nest there is none. I have met with one or two holes where the bird had evidently erred in its calculations. One in particular was about fifty feet from the ground, and had been begun in a tree too sound for the purpose ; the hole was chiselled out of the solid wood, and must have cost its maker great labour, having been driven forward in a horizontal direction for about nine inches, but the wood continuing sound the bird had apparently become disheartened in her work, and abandoned it. When I first discovered it it had not been long deserted, for I took the trouble to climb up and carefully examine it, measuring the depth with my stick, and ascertaining by the sound that the wood at the bottom was free from decay. I could not help wondering how the bird, in a hole not larger than the diameter of his own body, could find room to give those violent strokes with its bill which would be necessary to penetrate the solid oak."

DO WOODPECKERS EVER MIGRATE?

The following on this subject we extract from *Land and Water* July 13 :—"We may observe that the black woodpeckers (*Picus martius*) which have undoubtedly been observed in the British Islands, however rarely and at distant intervals, can hardly have been other than stragglers from the neighbouring continent. Two much more remarkable instances, however, are upon record (in the 'Zoologist' for 1859), of different species of woodpecker which must have traversed the breadth of the Atlantic! The first relates to the common golden-winged woodpecker (*P. auratus*) of the United States, an example of which was obtained in the county of Wiltshire ; the second to a specimen of what appears to have been the downy woodpecker (*P. pubescens*), also a common North American species, which was shot in Dorsetshire. As regards the first, Mr. George S. Marsh, of Chippenham, states—'I have in my collection a specimen of the golden-winged woodpecker, killed in Amesbury Park, in the autumn of 1836. My brother, now member for Salisbury, saw this bird in the flesh before it was preserved ; it was brought to him just after it was shot. It was preserved by Mr. Edwards, of Amesbury, and has never been out of my possession.'

The other (*P. pubescens*) 'was shot by Mr. E. P. Cambridge, of Broxworth Rectory, Dorset, in December 1836, from his bedroom window, as it crept among some low shrubs in one of the flower-beds of the lawn.' Full particulars are given, and the bird seems (from the description of it) to be the familiarly known Transatlantic species to which it is referred. Of the well-known *Picus varius* of the United States Mr. Gosse remarks, in his 'Birds of Jamaica,' that four or five specimens of this beautiful woodpecker, all females, occurred to us in the months of December, January, and February, but at no other time was it seen. I have no doubt it is a winter migrant from the northern continent, where, however, Wilson states that it abides all the year.' It is hazardous to argue much from analogy. Reasoning thus, we should indubitably conclude that all woodpeckers were necessarilly tree-frequenting birds, and that no popular appellation could be more thoroughly appropriate; and yet Mr. Darwin tells us, in the 'Zoology of the Voyage of H.M.S. Beagle,' of a true woodpecker (so far as structure is concerned) which only inhabits treeless territory, and has never been seen upon a tree! In like manner, a species of nuthatch (the *Sitta syriaca*) is only observed creeping about rocks—never upon a tree; whereas the other nuthatches are as exclusively and emphatically tree-frequenting birds. The hoopoe, to all appearance, is a bird of fluttering and feeble flight, which is performed in undulations like that of a woodpecker or tree-creeper, and nobody would suspect that it could be very long protracted or sustained: yet the hoopoe is a well-known migrant; and the late Bishop of Norwich (Dr. Stanley) has recorded, in his 'Familiar History of Birds,' that a hoopoe approached a vessel in the middle of the Atlantic, and kept company with it a good way, but did not settle on board, as it probably would have done had it been tired.' No person who had only observed our tiny goldcrests flitting about our conifers chiefly, and other evergreens, would suppose that those diminutive birds could reach our islands from Scandinavia in vast multitudes, as testified from personal observation by the late Mr. Selby and other naturalists. Who, again would suspect from its structure that the short-winged corn-crake, or land rail, was a regular migrant? And yet people formerly imagined that the powerful winged swifts and swallows were wont to hybernate rather than to cross the sea.—Ed."

Scorpion of Texas.

The Scorpions of Middle Texas, so far as I have investigated the subject, do not extend beyond a single species. There may be others, but I have not observed them. The species we have is viviparous, carrying its young, eight in number, on its back, until they are three-fourths of an inch in length. When first seen, clinging to the back of the mother scorpion, they are so small that it requires a microscope to examine them satisfactorily. They are white, and look as if they were very tender. They cling tenaciously, and when by violence they are separated from the mother, she shows manifest signs of distress, running about till she comes in contact with the lost ones, when they immediately climb up and cling again closer than before. At this early period, they seem already to be well versed in scorpion tactics, wielding their nimble tail, and its recurved weapon, with dexterity and swiftness.

Scorpions pass the winter in close quarters, and generally in a torpid state. They are seen early in warm weather coming out at nights, and sometimes during warm damp periods in winter. They are altogether nocturnal in their habits, and are carnivorous, subsisting on insects of various kinds, and even small lizards. As a speciality, they prey largely on crickets. They dwell under old logs, rocks, in old stumps, under the bark of dead trees, under old fences, between the shingles on house-tops, and particularly about the jambs and hearths of fire-places. In temper they are hasty, and will employ their weapons on slight occasions. The pain occasioned by their venom, when injected into one's flesh, is very quickly felt, and quite severe, giving the idea of a burning-hot fluid thrown into the system. It does not last long, nor does it swell much, and is not so painful, nor does it produce so much inconvenience as the sting of the honey-bee. In countries where they abound, people do not regard them with much terror. Chickens are very fond of them, and voraciously devour every one they can find.

I once found a mocking-bird (*Mimus polyglottus*) which by some awkward stroke in his rapid flight, had fractured his right wing. It was running on the ground, and had become quite hungry and light. After dressing and securing the little songster's wing, I turned over some old rails in search of something for him to eat. There were plenty of crickets and scorpions concealed under the rails, for the latter of which he showed the greatest preference. He would peck at them, and by bruising and thus stunning them a little, readily swallow them whole. After he had swallowed seven of them, I thought, as I had volunteered my services as surgeon and physician for him, it would not be prudent for me to suffer him to indulge further at this time; so I placed him in a large cage with some canary birds, where he remained feasting on nine scorpions a day, until he had recovered the use of his wing, when I set him free.

Scorpions are generally found two or three together, sometimes in large numbers. They shed their skins without a rent, coming out at the mouth, like the snakes. They moult when they are about half-grown, and again when they come to maturity, and I do not know that ever they cast their skin again during the remainder of their life. They live through two winters, as I can testify, and may exist many years. They are not possessed of much intelligence, making no nests or preparation for winter, beyond crawling under rocks and other dry and sheltered places, their principal cerebral developments are amativeness, alimentiveness, and cautiousness.—G. Lincecum, M.D., in *The American Naturalist*, June, 1867.

The Kingfisher.

None of our native birds can boast of more beautiful plumage than our little kingfisher (*Alcedo ispida*); the glossy metallic blues and greens with which it is adorned seem to belong more to the parrots, trogons, and other species peculiar to warm or tropical countries. Indeed, when I watch the rapid flight of a kingfisher, it always reminds me strongly of some of the Australian parrakeets, especially the *Lathamus discolor*, the metallic colours of whose plumage show most brilliantly during their glancing flight, particularly when the sun is shining.

The kingfisher is constantly to be seen, and yet is not an abundant species with us. The two small streams, the Morn, and the Idle, which intersect our forest district, are very favourable to its habits and requirements; but though it delights to seek its food in secluded spots, it does not confine itself to such, and I have repeatedly seen them glancing up and down the stream which runs past the village, and darting through the arches of the bridge as I stood on it. I have even taken its eggs from a hole in the bank of the stream within a stone-throw of some houses, and of my own garden.

The nest of the kingfisher is another of those questions on which naturalists have greatly differed, and I know not that my own observation has enabled me to throw much light on the matter. Whether a layer of fishbones is *purposely* laid for the reception of the eggs, as Montague asserts, I cannot say, but in every nest I have examined I have never found any other material used, nor have I ever seen the eggs on the bare ground. In every instance they rested on a layer of the castings, which were slightly hollowed for them, though the latter form may have been produced by the mere weight of the parent bird while the eggs were laid. I believe that a deserted hole of the water-rat is usually chosen, and that they rarely excavate for themselves.

The young ones, after they have left the nest, are exceedingly clamorous; so much so, that their loud, shrill twitterings were once the cause of my witnessing the interesting scene of a brood being fed by their parents. They were six in number, and were perched on the boughs of a dead bush overhanging the stream. They seemed very voracious; for though both the parent birds were constantly bringing them food—sometimes a small fish, sometimes what appeared to be like a slug or leach—they apparently failed in satisfying their appetites, and every fresh supply was eagerly competed for, sometimes a sort of scuffle taking place as to which was to receive it. During the absence of the parents the young ones sat very quietly; but their distant approach was quickly perceived, and in a moment their listless attitude was changed into one of animation, they stretched themselves eagerly forward, and with loud twitterings and open mouths showed how expectant they were —W. J. Sterland, in *Field* June, 22nd.

New Books.

[*Our limited space must of necessity compel us to give but very short notices of new books, but they will perhaps serve as a guide as to what books our readers may ask for at their libraries.*]

Wanderings of a Naturalist in India, the Western Himalayas, and Cashmere. By Andrew Leith Adams, M.D., Edinburgh: Edmonstone and Douglas.

Happy the man, who travelling in a foreign country carries with him some knowledge of natural history. He cannot be at a loss. Though a stranger in the land and ignorant of those he dwells amongst, he is in no want of society; to him the book of nature is opened, and every object animate or inanimate becomes a companion by the way. It is to be regretted that there are so few who possess any adequate knowledge of these subjects; it would surely be better that Natural History should receive more attention, and meet with a more genial recognition at our schools. As it is many of our best students of nature are unable to give to the world the result of their observations. Thrown by chance or necessity in a foreign country, perhaps hundreds of miles away from any of their own countrymen, they naturally take an interest in the ever varying phenomena to be met with, but are unable theoretically to account for or describe such. Those pioneers of civilization in the West, the backwoodsmen and squatters must have far more knowledge of the denizens of the forest and the prairie than any educated and learned man could obtain by a short stay or rapid journey; indeed, how much of the information gathered by these latter has been collected from the rough descriptions of the former. We doubt not that many a bee hunter in the oak openings of the West could have told as good a story of the wild bee's life, instincts, and habits as recent writers have given of the domestic species. Or the hunter tracking the grisly to his den, or scampering over the prairie after the bison, gives us far better accounts of such than my Lord or Right Honorable, who takes a short run and returns to write a glowing account of what he did not see. But want of proper education and training has placed it out of the power of our rougher naturalists to give us the results of their observation. In corroboration of this, we may point to the number of army surgeons, doctors, missionaries, &c., who have given us good and truthful descriptions of the aspects of nature abroad. These are men whose particular professions have compelled them to make a study of such subjects, and being placed at some foreign station, they have turned their knowledge to account, and sent such particulars from time to time as have enabled us to form a pretty good idea of the Flora and Fauna of the world at large. Neither are these the only men, though they form the majority to whom we owe the best works. They gather and transmit the facts from various localities and in small portions, which our more polished writers at home carefully collect and compare, thus producing works by which their respective authors become famous.

It is to an army surgeon that we owe the present entertaining and instructive work. Mr. Adams has taken great pains to present us with a fair description of the Zoology, Botany, and Geology of India. He says, during a sojourn in the East of seven years with frequent change of place, he had many opportunities offered him of making acquaintance with various objects of natural history, the local scenery of Northern India, and the Western Himalayan Mountains; and further on he writes, "In the following reminscences I have aimed at preserving the objects in the order they appeared to me, and attempted to describe the scenes and circumstances with which I was brought in contact, as minutely as the incidents of travel would allow, and in a belief that my jottings by the way would add zest to the drier descriptions of animals. We refrain from making any more quotations here, as we have already done so at some length on another page. We strongly recommend our readers to procure the volume, feeling sure that they will join with us in thanking the author for several hours' most pleasant reading.

A Handy Book to the Collection and Preparation of Freshwater and Marine Algæ, Diatoms, Desonids, Fungi, Lichens, Mosses, and other of the lower Cryptogamia, with instructions for the formation of an Herbarium. By Johann Nave. Translated and edited by the Rev. W. W. Spier, M.A. London: Robert Hardwicke.

We heartily welcome this little work, the want of such a guide having long been felt. Our amateur microscopists are now to be counted by thousands, and it is not in the power of every one to obtain the various works upon the subject issued from time to time, and which are as a rule very expensive. We expect that many have floundered about in the slough of despond, solely through having no adviser; therefore to many, a treatise detailing the necessary instruction, and procurable at a low price, will be invaluable. Mr. Nave aptly points this out in his preface: "the lower Cryptogamia, especially such as the Algæ and Fungi, require a somewhat complicated treatment, so much so that many a beginner is frightened from prosecuting his studies; disgusted by the continued failures which, without a guide to lead him, it was next to impossible for him to escape," and, indeed, we do not think the amateur wise to make such an attempt without the assistance of this little work, or he will most probably find a very great portion of his time thrown away; the principal part of the work treats of the Algæ as being the most extraordinary in variety of form and habit, and requiring many descriptions of methods of preparation. The volume is profusely illustrated, and is in fact all that can be desired.

British Grasses; an Introduction to the Study of the Gramineæ of Great Britain and Ireland. By Margaret Plues. London: Reeve & Co. Crown 8vo. Pp. 307.

This is a very nice little volume, containing sixteen coloured plates drawn from the designs of Mr. Fitch, as well as numerous woodcuts. It comprises descriptions of all the British Grasses, Agricultural, Economic, and Ornamental, and will be found a popular and useful handbook to all who are interested in the subject.

FRENCH AND AMERICAN WORKS.

Mind in Nature: or the Origin of Life, and the Mode of Development of Animals. By Henry James Clark, A.B., B.S., Adjunct Professor of Zoology in Harvard University, Cambridge, Mass.; Member of the American Academy of Arts and Sciences, Boston, Mass., of the Boston Society of Natural History, Corresponding Member of the American Microscopical Society of New York. &c., &c. With over 200 Illustrations. New York: D. Appleton & Co. London: Trübner & Co. 1865.

We have here an elaborate treatise on the organization of animal life. The work is dedevoted principally to microscopic researches, in which the writer has occupied many years, and from which he appears to have derived some important conclusions. It contains also an account of certain experiments on "spontaneous generation." The object is to prove the existence of a Creative Mind perpetually at work from the plan of the animal creation. The drift of the argument is somewhat obscure, but the value of the physiological inquiries which form the substance of the work is not thereby affected.

Annual of Scientific Discovery; or, Year-book of Facts in Science and Art for 1866 *and* 1867, *exhibiting the most important Discoveries and Improvements in Mechanics, Useful Arts, Natural Philosophy, Chemistry, Astronomy, Geology, Zoology, Botany, Mineralogy, Meteorology, Geography, Antiquities, &c., together with Notes on the Progress of Science during the Years* 1865 *and* 1866; *a List of Recent Scientific Publications, Obituaries of Scientific Men, &c.* Edited by Samuel Kneeland, A.M., M.D., etc. Boston: Gould & Lincoln. London: Trübner & Co. 1867.

This is a yearly account of all that has been done to forward the progress of science during the year; of mechanical inventions and improvements, of the achievements and discoveries in all the different branches of natural science, of the books published on these and kindred subjects, and memoirs of eminent scientific men who have died during the last twelve months. The volume is small, and the amount of information concentrated in it is wonderful, making it extremely valuable to all lovers of science.

Rapporte sur les Progrès de la Mineralogie. Par G. Delafosse. Paris and London: Hachette & Co.

This is one of a series of reports suggested by the Paris Exhibition, detailing the progress made by France in the various departments of Science, Literature, and Art. In it M. Delafosse, a Member of the Académie des Sciences, discusses the subject of mineralogy, taking it up at the point where the celebrated Abbé Hauy had left it. The learned gentleman gives an account of the principal discoveries, and reviews the leading publications referring to that particular science, and the result shows that for the last twenty years the advance made by French mineralogists and crystallographers has been unprecedented.

New Book of Flowers. By Joseph Breck. Newly Electrotyped and Illustrated. New York: Orange Judd & Co. London: Sampson Low, Son, & Marston.

An interesting Book of Flowers, intended for amateur gardeners, who will find it useful to refer to its pages.

Meetings of Learned Societies.

ZOOLOGICAL SOCIETY.

At a meeting held, Dr. E. Hamilton in the chair, Mr. P. L. Sclater exhibited a specimen, in spirits, of a rare snake, *Siphlopis fitzingeri*, from the coast of Peru. Lord Lilford exhibited a fine nest, with four eggs, of the nutcracker, taken in the Hochanger Alps. Mr. A. D. Bartlett read a paper on the habits and affinities of the lyre-bird. Mr. E. Blyth made some remarks on the deer found in the Indo-Chinese region. Dr. Edwards Crisp read a paper on the comparative form, size, and structure of the viscera of the hippotamus as compared with the same parts in the members of the pachyderm family, and in other animals, and exhibited preparations and casts of the various parts. Mr. St. George Mivart contributed two papers, one on the *Plethodon persimilis* of Gray, and the other on the myology of *Iguana tuberculata*. Dr. H. Burmeister communicated a paper describing a new species of Finner whale (*Balænoptera bonaerensis*) found in the River Plata, near Belgrano, about ten miles from Buenos Ayres. Messrs. P. L. Sclater and O. Salvin read a paper on the birds collected by Mr. E. Bartlett on the river Huallaga, Eastern Peru, with notes and descriptions of the new species. A paper, by Surgeon Francis Day, of the Madras army, was read on some new or imperfectly known fishes obtained from the sea and fresh waters in the neighbourhood of Madras. Dr. J. E. Gray read some notes on the specimens of *Calyptraidæ* in the Cumingian collection. Mr. A. G. Butler communicated some remarks upon the Fabrician species of the *Satyridæ*, genus *Mycalesis*, with descriptions and notes on the named varieties. Dr. J. C. Cox, secretary of the Entomological Society of New South Wales, sent a paper giving descriptions of some new species of Australian land shells. Mr. J. Yate Johnson, C.M.Z.S., gave a description of a new genus of *Spinacidæ*, founded upon a shark obtained at Madeira. Captain R. C. Beavan, C.M.Z.S., read some notes on the Panolia deer (*Cervus eldi*). Professor Lilljeborg, of the University of Upsala, communicated the description of *Halcrosia afrelii*, a new crocodile from Sierra Leone. Dr. J. Murie read a paper describing the anatomy of the pilot whale.

ETHNOLOGICAL SOCIETY.

At a meeting held on June 25th, J. Crawfurd, Esq., president, in the chair, the Lord Colonsay and Sir Basil Maxwell were elected fellows. "Notes on the Tenure and Distribution of Landed Property in Burmah," by Sir A. Phayre. Whatever may originally have been the relative rights of kings and people to the soil in other countries, in Burmah the ancient book of the Dhama-that, or Laws of Menu, represents the people as conferring a share of the produce on their elected king; the right of the King of Burmah, therefore, to a portion of the produce of the land rests on a very different foundation from that of the ancient kings of Egypt. In the former case it is distinctly laid down as springing from the free gifts of the people. In the latter the right was reserved to himself by the King, when he settled cultivators on the land as mere tenants.—"On the Ethnography of the French Exhibition as represented by National Arts," by Mrs. Lynn Linton. This was a most charming paper, as important as interesting to the hearers, from the rich language in which her descriptions of the various products of divers nations were noticed. The history of the development of human ingenuity was capable of being traced from the most primitive efforts at bead stringing to bark ornaments and skin garments, up to the latest invention in telegraphy, steam appliances, and to architecture was reviewed, and the various people who illustrate by their presence in the Exhibition the human race at present existing. The paper was received with loud applause.—"On the Antiquity of Man," by the President. The lowest conceivable primitive state of man was taken as the basis of an argument for the gradual development of civilisation. The main views culminate in the following paragraph:—It may seem to derogate from the value of the evidences now adduced in favour of man's antiquity, that the veritable records which he has left of his own existence are comparatively recent. He had to pass through all the stages enumerated. The dumb and naked savage had to frame a language, to acquire the arts requisite to furnish himself with a permanent supply of food and clothing, to discover the useful metals, to invent the art of writing, to acquire such a knowledge of the heavenly bodies as would enable him to construct a Kalendar, and, in short, to attain that maturity of intellect by which he would be able to make a trustworthy and transmissible record of his own actions. Tracing back to their earliest dates the architectural works of the Egyptians, Chinese, Assyrians, Hindus, and other admittedly ancient peoples, the full date of their monumental histories was shown to be a comparatively recent era, beyond which it was necessary to look back into a much longer vista of previous time, during which those races had progressed from brute barbarism to that degree of civilisation which the earliest of their respective monuments proved each of them had at that epoch actually attained.

Geographical Society.

On June 24th, Sir R. I. Murchison in the chair, the list of newly-elected fellows contained the follownames :—Messrs. C. J. Bayley, F. A. Goodenough, R. Plant, General Sir Moyle Sherer, and the Hon. R. G. Talbot.—The Rev. W. V. Lloyd, R.N., read a paper on the harbours on the East Coast of Manchouria, now being colonised by Russian settlers. He described the rivers as containing great numbers of salmon, bears are very abundant, and tigers are numerous, judging from the skins he saw and the continual depredations they committed. The people were civil, the Russians in charge of the settlement most considerate and courteous to strangers. He heard selections from the operas well played on pianos in private families, and the only drawback to their happiness was a want of white sugar.—Sir Arthur Cotton "On Joining the Rivers Burhampooter, in Assam, with the Yangtse-Kiang in China, by a short route of 200 miles of unexplored country, by which means Calcutta and the cities of China would enjoy the benefit of water-carriage for heavy goods, and Europe would vastly benefit by the more ready introduction of her commerce." This scheme has frequently occupied the minds of all acquainted with enterprise in these countries, and the difficulties which formerly stood in the way of such intercourse being now removed, no time should be lost in opening up this simple route. Sir Roderick said it was a similar idea which induced Peter the Great to join the great Russian rivers, and by their means traffic in that country is carried on most satisfactorily. But in Assam the hill country was almost inaccessible. The snows and ice of winter, the deep gorges in the hills, the basket haunt over rapid torrents, the inhospitable people said to inhabit the locality mentioned by Sir Arthur would, he feared, prevent the project being accomplished. General Balfour said until these high mountains were actually surveyed, until we really knew if the country was what was represented—and he had no idea it was so difficult—he hoped the project would not be given up. Central China would send her articles of trade by this route, emigrants would go down to the tea-gardens of Assam, where there was plenty of work for thousands of her population, and the goods from England could at once pass up from Calcutta to the Eastern Coast of China without interruption. Dr. M'Cosh, who wrote on this subject thirty years ago, pointed out a route by Dacca; General Sir A. Phayre supported this view, and still held that the hills proposed by Sir A. Cotton should be explored. Mr. Crawfurd did not approve of the plan, on the score of the province of China next Assam being poor and only capable of growing rhubarb, of which "a very little went a very long way;" the leeches, too, to say nothing of the savage tribes of the Mishmee Hills, he thought would never permit the transit contemplated; however, he should like, in the interests of geography, that the unknown should be made known, and was convinced that water was the best aid to commerce, but that water way round the Cape of Good Hope. Sir Arthur, in reply to the many speakers, said he was still convinced that the route he contemplated was well worth a trial, and the cost would be insignificant, while the gain would be incalculable.

Geological Society.

At the meeting held on June 19th, W. W. Smyth, Esq., president, in the chair, Mr. W. T. Lewis was elected a fellow. The following communications were read:—"On Cyclocyathus, a New Genus of the Cyathophyllidea, with remarks on the Genus Aulophyllum," by Mr. P. M. Duncan.—"On the Discovery of a New Pulmonate Mollusk (*Conulus priscus*, P. P. Carpenter) in the Coal Formation of Nova Scotia," by Dr. J. W. Dawson.—"On some Tracks of Pteraspis (?) in the Upper Ludlow Sandstone," by Mr. J. W. Salter.—"On a New Lingulella from the Red Lower Cambrian Rocks of St. David's," by Mr. J. W. Salter and Dr. H. Hicks.—"Observations on certain Points in the Dentition of Fossil Bears, which appear to afford good Diagnostic Characters, and on the Relation of *Ursus priscus*, Goldf., to *U. ferox*," by Mr. G. Busk.—"On the Geology of the Province of Canterbury, New Zealand," by Dr. J. Haast.—"On the Chemical Geology of the Malvern Hills," by the Rev. J. H. Timins.—"On the Relative Distribution of Fossils throughout the North Devon Series," by Mr. T. M. Hall.—"On the Geology of the Princess Islands in the Sea of Marmora," by Mr. W. R. Swan.—"On the Sulphur Springs of Northern Formosa," by Mr. C. Collingwood.—"On the Geology of Benghazi, Barbary, with an Account of the Subsidences in its Vicinity," by Mr. G. B. Stacey.—"Report on the Existence of Large Coalfields in the Province of St. Catherine's, Brazil," by Mr. E. Thornton.—"On the Sources of the Materials composing the White Clays of the Lower Tertiaries," by Mr. G. Maw.—"On the Post-Glacial Structure of the South-East of England," by Mr. S. V. Wood.

Entomological Society.

On July 1, Sir John Lubbock, Bart., president, in the chair, Dr. G. W. Davidson was a elected a member. Mr. Busk mentioned, on the authority of Dr. Cobbold, that the small worm exhibited at the previous meeting was not, as then supposed, *Gordius aquaticus*, but *Mermis nigrescens*. Mr. M'Lachlan exhibited *Ciniflo ferox*, from Folkestone, where that spider had been captured by Dr. Knaggs; and a large spider and a centipede, found in the hold of a ship which had recently brought a mixed cargo, chiefly sugar and hemp, from Manilla. The Secretary exhibited branches of an orange-tree, from the Botanic Gardens, Sydney, New South Wales, infested by two species of Coccus. Mr. Stainton exhibited upwards of thirty species of Micro-lepidoptera, reared from larvæ which he had collected at Cannes and Mentone in February and March. Amongst them were *Depressaria rutana*, *Phibalocera quercana*, bred from Arbutus, two species of Gelechia, which fed on *Silene Nicæensis*, a new Zelleria, bred from the flowers of *Phillyrea angustifolia*, and a Nepticula, bred from the cork-tree. The Hon.

T. De Grey exhibited *Enpæcilia anthemidana* and *rupicola*, from Norfolk ; and mentioned the capture in Kent of five specimens of *Hypercallia Christierninana.* The following papers were read :—"A Catalogue of the Cetoniidæ of the Malayan Archipelago, with Descriptions of the New Species," by Mr. A. R. Wallace. 181 species were enumerated, and of these no less than 70 were described as new.—"Observations on Dzierzon's Theory of Reproduction in the Honey-Bee," by Mr. J. Lowe. With a view to test the truth of the theory that "all eggs which come to maturity in the two ovaries of a queen-bee are only of one and the same type, which, when they are laid without coming in contact with the male semen, become developed into male bees, but, on the contrary, when they are fertilised by male semen, produce female bees," from which theory, if true, we might, in the words of Van Siebold, "expect beforehand that by the copulation of a unicolorous blackish-brown German and a reddish-brown Italian bee, the mixture of the two races would only be expressed in the hybrid females or workers, but not in the drones, which, as proceeding from unfecundated eggs, must remain purely German or purely Italian, according as the queen selected for the production of hybrids belonged to the German or Italian race," the writer set to work to obtain hybrids between *Apis mellifica* and *Apis Ligustica*, and also between *Apis mellifica* and *Apis fasciata*, and the result of his experiments was that Ligurian queen-bees fertilised by English drones, and Egyptian queen-bees fertilised by English drones, both produced drones which, as well as the workers, were hybrid in their characters, and bore unmistakable evidence of the influence of the male parent. From this the author drew the conclusion that the eggs of a queen-bee which has been fertilised by a drone of another race, whether they develope into drones or workers, are in some way affected by the act of fecundation, and that both sexes of the progeny partake of the paternal and maternal character or race ; from which it followed that Dzierzon's was not the true theory of reproduction in the honey-bee. Specimens of the hybrids were exhibited to the meeting ; and Mr. F. Smith (who did not consider *Apis Lignstica* to be specifically distinct from *Apis mellifica*), after an examination of the specimens, corroborated Mr. Lowe's statement that the hybrid drones distinctly showed characters peculiar to *Apis mellifica* in combination with the characters which distinguish *A. Lignstica* and *A. fasciata* respectively.

Botanic Society of Edinburgh.

The meeting of this society was held on July 3, W. Gorrie, Esq., V.P., in the chair. The following communications were read :—I. "On the Arctic Cladonæ." By W. Lauder Lindsay, M.D. In this paper the author commenced by defining the term arctic, applying it only to those parts in Europe, Asia, and America which are situated within or northward of the arctic circle. These regions include vast level, generally treeless, barren tracts of country, whose vegetation is frequently exclusively lichenose, sometimes, indeed, consisting of a single species, the cosmopolite Cladonia rangiferina, or Reindeer Moss. The author enumerated the different species and their forms belonging to the Cladoniæ found in arctic countries, and remarked that, whether these may be regarded as consisting of many or few species, their importance to man cannot be estimated by their mere numerical relations ; one species at least (C. rangiferina) is not only superior in economical and even political importance to the better known "orchella weed," but it is in this respect quite on a footing with the valuable grains, timber trees, and other phanerogams of more favoured regions. The author then, in conclusion, considered the economical value and application of the arctic Cladoniæ under the following heads :—1, as fodder or forage to animals, domesticated or wild—*e.g.*, the reindeer and caribou of the European, Asiatic, and American continent, cattle and pigs, &c. ; 2, as an ingredient of man's food ; 3, as medicines or ingredients thereof, in virtue of their starchy or bitter principles—*e.g.*, tonics, astringents, febrifuges, emetics ; 4, in the arts—*e.g.*, perfumery and dyeing.—II. "Recent Regulations regarding the Forest Department of India." By Prof. Balfour.—III. "Recent Botanical Intelligence." By the same gentleman.—IV. "Sexual Organs of Fungi." Dr. Balfour referred to a paper which had been recently published by Dr. Antoine de Bary, in which the author had clearly demonstrated that in the lower class of Fungi the sexual organs greatly resemble those of other Cryptogams. In the former plants the fertilisation takes place by means of the contents of two different cells coming in contact—the one called Antheridia, and the other Oogonia, representing the antheridial and archegonial cells in Ferns, Mosses, &c. Dr. Balfour exhibited and explained coloured drawings illustrating the subject.—V. "On a Supposed New Species of Vellosia, or probably a New Genus in the Order Hæmodoraceæ. By Prof. Balfour. Dr. Balfour stated that he had received from H. Fox Talbot, Esq., Lacock Abbey, Chippenham, the flowers of a plant which he had transmitted to the Royal Botanic Garden last year. It is a native of Natal, and appears to belong to the nat. ord. Hæmodoraceæ. It has not yet flowered in the Botanic Garden, but the following are some of the characters taken from the plant and from the flowers sent by Mr. Talbot :—Stems shortened, triangular, covered with brown scales at the lower part. Leaves with equitant vernation, alternate, distichous, sheathing at the base, lanceolate, about 6 inches long, margins with sharp serratures, apex sometimes split. Flowers solitary, on slender peduncles about 6 inches long ; perianth six-leaved, at first delicate lilac, afterwards becoming greenish-white, dry, and persistent, the green colour appearing particularly in the veins, which become prominent ; outer leaves of perianth ovate-oblong, and somewhat acuminated ; inner leaves bluntish. Stamens six, with very short filaments ; anthers, two-celled, narrow, about five times longer than the filaments, opening longitudinally and laterally. Pistil about the length of the stamens. Ovary inferior (one or three-celled), style thick, stigma large, somewhat tongue-shaped, grooved. Ovules, oblong, numerous, attached to a central placenta, anatropal. Vellozias are chiefly natives of Brazil. This plant seems to represent the genus in Africa, and possesses interest on that account. Dr. Balfour proposed to call it Vellozia Talboti. It may turn out to be a new genus; if so, the name Talbotia will be given to it; but the determination of this point must be delayed until the plant flowers at the Botanic Garden.——6. *On the Discovery of Orthotrichum phyllanthum near Edinburgh.* By Mr. John Sadler.

QUEKETT MICROSCOPICAL CLUB.

A monthly meeting was held at University College on the 28th of June, Mr. Ernest Hart, President, in the chair. A paper was read by Dr. Robert Braithwaite on "The Organization of Mosses," which he prefaced with some remarks on the writers on Bryology. He afterwards described the distinctive characters of the spores, stems, leaves, reproductive organs, development of the fruit, sporangia, &c., as well as the habitats of Mosses, mode of collecting, examination, preservation, and uses. At a conversazione which followed, the members had an opportunity of viewing under the microscopes carefully prepared specimens of the spores, prothallia, antheridia of male flowers, leaves showing the chief forms of cell structure, and capsules showing the modifications of the peristome, &c. Four members were elected.

Correspondence.

[*Under this head we shall be glad to insert any letters of general interest.*]

GLACIAL ACTION.

SIR,—An extract from "The Open Polar Sea" occurs at page 66 of the NATURALIST'S NOTE BOOK in which the author states that the exact principle of movement of the ice in glaciers has not yet been determined, and seems to incline to the *plastic* or *viscous* theory of Professor Forbes. Is not that theory now almost universally admitted to be erroneous and inadequate to explain all the phenomena of glacial action? Glaciers do not stretch and accommodate themselves to the irregularities of their bed, as they would do were they formed of a plastic material, but crack and give way under the slightest tension.

Now it has been demonstrated by Professor Tyndall, in a series of beautiful experiments, that ice, after being reduced to powder, can be again consolidated by pressure. This results from the fact that two pieces of ice in a melting state will, if brought into contact, immediately freeze together. Pressure being applied to the pounded ice, by means of a mould filled with a piston as in the Professor's experiments, the particles are brought into close contact, and a solid mass of ice is the result.

The principle of movement in a glacier then is this,—the ice being pressed upon by the superincumbent mass is broken up gradually; the particles roll over each other, as it were, in the direction of the greatest pressure, and are by the same pressure consolidated into a mass. Thus a constant process of pounding and *regelation* (as it is called) goes on along the whole course of the glacier, by which it is continually kept in motion. De la Rive, in his inaugural address for 1865, as President of the Swiss Society of Natural Sciences, thus applies the principle of regelation to glacier action. "Supposing, for example, a graduated series of moulds to exist, each of which differs very little from the one which precedes and that which follows it, and that a mass of ice could be made to pass through all these moulds in succession, the phenomenon would then become continuous. Ice is only plastic under *pressure*, it is not plastic under *tension*, and this is the important point which the vague theory of plasticity was unable to explain."

Hoping I have not trespassed too much on your valuable space,

I remain, Sir,
Yours truly,
GULIELMUS.

Faversham, Kent,
July 10, 1867.

MIGRATION OF INSECTS.

SIR,—It is given as an opinion on page 164 of the *Naturalist's Note Book* that insects migrate, and that the migration of birds of passage is simply their *following* the insects on which they feed.

Now I think it seems improbable that creatures of such poor powers of flight, as most insects have, should undertake so formidable a journey as two or three thousand miles; and supposing they did, the time spent upon the journey would be so great, as to lead to the conclusion that their lives were spent in travelling alone, especially as insects are very short-lived. Is it not more probable that birds of passage themselves are influenced by the changes of the seasons; that they are induced to leave this country by the coldness of the weather, and to return by their affection for the place in which they were born?

Then, again, it is well known that immense quantities of insects survive the winter in holes and crevices, in hedges and ditches, under leaves and mounds of earth, in fact in any place capable of affording them protection from the severity of the weather, where they remain in a torpid state till spring. It is supposed also that large numbers die off every year at the approach of the cold season.

These facts, considering the enormous supplies consumed during the summer might, easily account for the disappearance of insects towards winter, without supposing them to migrate.

If any one of your readers will give me any information on this interesting subject he will greatly oblige

Yours truly,
R. W. B.

Short Notes.

THE GOOD OLD TIMES.—About the year 1809 I was introduced to a residence amidst the beech timber and underwood and commons which abounded on the Chiltern Hills of Buckinghamshire. At this time very many animals and reptiles were denounced as common enemies, and, as such, a price was set upon their heads, decided upon by the vestry and paid by the churchwardens, as shown by the following items as charged in the churchwardens' accounts of the period:—"A viper, a slow or blind worm, 6d. each." These were supposed to sting the sheep while at feed. The tongue of the former was supposed to be its sting, and the latter effected its injury by some other process; and many ailments amongst the domestic farm animals were attributed to the above causes. The general specific was an ointment made by frying the body of either viper, or slow-worm, in lard; and many a good housewife would pay the stipulated reward, thus to become a kind of Lady Bountiful, by a gift she bestowed of the grand specific to anyone requiring it in the neighbourhood. Sixpence was also the price set on the poor hedgehog. He was charged with sucking the milch cows as they lay down during the night, thus producing a disease called "the gargut,"—being no other than an inflammation of the udder, generally then, as now, produced by cold. The grand specific for this was an ointment of hedgehog fat. Another charge was for the destruction of sparrows. In the spring of the year, the price, regulated by the annual March vestry, was, for sparrows' eggs, a halfpenny a dozen, young sparrows a farthing each, hen sparrows, a penny each, cock birds, a halfpenny each. Thus, without taking into consideration the good arising from the destruction by them of innumerable insects, pests of garden and field, they were denounced for injury done to wheat just on the edge of harvest. I am not aware of any kind of parochial reward for foxes, as the slayer of a fox considered himself amply rewarded by carrying it to all the farmers in rotation, a shilling being the expected reward; but a good poultry wife would often make an addition of a bit of victuals and a pint of beer. After having done duty in the neighbourhood of its death, it would be sold by its cunning possessor to some mate in another district, who would pass it off as fresh killed till decomposition would render it past endurance, and the trick was "smelt out." Things are now changed: vipers, whose bite is venomous, and who would rather glide away than attack, are almost extinct. The slow or blind worm neither bites or stings; and the hedgehog, whose small mouth renders it incapable of sucking the mammal of a cow, and whose prickles would soon render its company disagreeable even to a sleeping cow, is now petted by the London bakers for the purpose of devouring the beetles which infest their bakehouses; and is equally useful for the same purpose against those that infest the gardens.—G. in the *Quarterly Magazine of High Wycombe Natural History Society.*

EARTH EATERS.—Many of the miners are natives of the neighbouring republic of Honduras. They are better workmen than the Nicaraguans, but enjoy the reputation of being greater thieves. Amongst them are some who practice the revolting habit of earth-eating. These earth-eaters do not constitute a separate tribe, but are principally negroes and half-castes, seldom Indians, never pure whites. They are easily recognised by their peculiarly livid and sickly colour. Their nickname, "toros" (bulls), must have been given them not on account of their bodily strength, for they are poor, emaciated people, but more probably because they lick the ground as bulls are sometimes wont to do. The earth which they eat is a kind of clay found in the mines. I shall have it properly analyzed when I get home, and it may then be compared with the edible earth of Syria, to which Ehrenberg's researches apply, and with that mentioned some time back by the *Pharmaceutical Journal.* It is called "jabonada," because when moist it has a certain soapiness and causes some foam when brought into contact with the saliva. It is cream-coloured, often tinged with pink, and has a slightly fatty taste. When well selected there is no sand in the pieces, the whole substance dissolving on the tongue; but as titbits of this kind are not always obtainable, a slight admixture of sand is not objected to. Earth-eating is a vice which, like any other vice, grows upon people, and when carrried to excess kills its victims without mercy. The same arguments which are applied to the suppression of drunkenness are applied, generally with as little success, to earth-eating. One of the miners in the Javali gave me a full account of the way he used to go on. He was about twelve years old when he took to the habit, and carried it on till he was twenty-five. Commencing little by little, he ultimately ate several pounds a day, and he lived successive days upon nothing but earth, always drinking a good quantity of water and feeling little or no appetite for any other kind of food. At most times he used to eat the earth as it came from the mine, but sometimes he would vary the flavour by an admixture of common brown sugar, or by toasting the clay over the fire. At last he carried earth-eating to such an excess that he became seriously ill, and had to give it up to save his life. More than two years had elapsed since that time, but he retained nevertheless the livid look peculiar to earth-eaters, and thought that he should never regain his natural colour. It is very difficult to say what proportion of the mining population of Chontales are addicted to earth-eating. As the majority regard it as a vice, many practise the habit on the sly; but from my own observation, I should say they amount to about ten per cent.—*Athenæum*, June 22.

WOODLARKS.—Although I cannot pretend to give a naturalist's opinion on the manners and customs of woodlarks, perhaps your correspondent, Mr. Dutton, will allow some weight to the experience of an amateur of some years' standing, who has always considered the woodlark the first of our native songsters, whether in confinement or in its natural haunts. I have seen many taken in nets and horsehair nooses, but I never saw more than ten or twelve in the same flock, and where as many as four dozen were captured at once I should say that some necessity had driven four or five flocks to unite at one point. They are not to be seen in the northern parts of France, except in very severe weather, and they are then taken in the hair meshes that Frenchmen understand laying out so well during the snow. No distinction is made between them and the skylark, unless it is that they sell at one penny apiece, or a halfpenny less than the others, on account of their smaller size, and this at a time when they bring the London bird-dealer from half-a-crown to five shillings apiece. I find that the food our neighbours give the skylarks, blackcaps, and other soft billed birds is better for them than the very doubtful mixture called "German pase." It consists of crushed hempseed, crumbled bread, chopped meat (raw or cooked), and chopped raw cabbage leaf. I am much inclined to think that the habit of omitting a turf in the woodlark's cage is the cause of the brittle nature of their legs after having been some months in confinement. There certainly must be some mistake in the way of keeping them, as few birds seem to survive the year in confinement. They appear to be very fond of chalk, and many persons give them a good supply crumbled in the bottom of their cage. I am not prepared to say it is necessary or healthful, although I can state that they and all larks will eat great quantities if allowed. I seldom see mention made of the crested lark (Alauda cristata), and as it is common throughout the year on the hills of the French coast exactly opposite to our own, I wish any resident on our side would state if they are ever met with. They have no regular song, but a fine clear call of half a dozen notes, frequently repeated. Our naturalists are generally silent on the distinguishing marks of male and female larks, and, notwithstanding some experience, I am compelled to follow their example, except in the case of the skylark, whose spur always overlaps the elbow in the male, if bent backwards. LULO.

P.S. I have just found a nest of the crested lark, containing four eggs, near Boulogne. As this nest is not described in the last edition of "Montagu," I can state that it is on the ground in an exposed situation behind a tuft of grass, and composed of fine fibres of the same material. The egg is about the size of the skylark's, but more rotund, of a pale brown, blotched with a darker shade of the same colour.

THE FOOD OF HUMMING-BIRDS.—The following interesting account of the food of humming-birds appeared a short time since in *Wilkes' Spirit*, a New York paper:—"In June I happened to be visiting at a house in Pleasant Valley, Erie county, Pa. One fine morning I was sitting in the doorway, looking out upon a neat flower-garden, when I noticed a number of beautiful humming-birds, flitting from flower to flower busy at their breakfast. Calling my host's attention to them, I remarked that I had seen the question of their food made a disputed point somewhere in print. It was denied that they took honey from the flowers, and asserted that they found in them minute insects, on which they fed. My friend, though a close observer, was not certain on the point, and it was proposed to satisfy ourselves, if possible, by offering them honey. He stated that he had caught humming-birds often, and thought he could do so again. It may be well to observe that the morning was still, and that a heavy dew lay upon the ground. Some honey was taken upon a case-knife, and we walked out upon the boarded paths between the flower-beds. Very soon one of the little fellows, a perfect beauty, one of those with the many-coloured, changeable throat, which sparkles so like a jewel, perched himself upon a board's edge, seeming much fatigued. My friend observed tha the was wet and heavy with the dew, and could not fly so long at a time as usual. We neared him once or twice, when he flew away, but at last he suffered us to get near enough to thurst the honey into his face. His bill touched it, but he was apparently perfectly ignorant of the nature of the substance. Again and again did we press our kind attentions; his little eye was seemingly 'on the cost of Greenland,' and a very speculative eye it was too, clear and knowing. His black and shining bill was shaped like a cobbler's pegging-awl. We were about to acknowledge that a humming-bird did not know or care anything about honey, when it occurred to one or the other of us to offer him some on a stick, instead of a knife. We had scarcely done so when his eye changed its far-off look, and running out from his bill something which looked like an exceedingly fine and narrow piece of white tape, he inserted it into the tempting fluid, and sucked away more like a hungry little pig than anything else we could think of. The tongue was put out from the bill nearly, if not quite, the length of the bill itself. It was a pretty sight. The little fellow worked with a will, and seemed perfectly at home. He satisfied himself, and assuming an air of comfort that would have done credit to an alderman, spent a few seconds in composing his thoughts, then away he went without so much as a thank you. We went into the house perfectly convinced that humming-birds do feed on honey."

ON CLEANING DIATOMS.—There is often considerable difficulty in cleaning the diatoms contained in guano sufficiently to render it possible to mount the frustules without the troublesome process of selection. The methods of Bailey and of Edwards are partially successful, but they injure the frustules a good deal, and leave amorphous matter in the slides. The following plan has been found very successful in several instances, and is worthy of further trial:—Take a beaker of six or eight ounces capacity, put into it not more than two teaspoonfuls of guano, and fill it up within an inch of the top with a saturated solution of carbonate of soda. Boil it for half an hour, wash the sediment well, pour off the last water very close, and pour in two ounces of hydrochloric acid. Boil for an hour, wash well, pour off the last water very close, and treat the sediment with an ounce of strong sulphuric acid; let the acid act for about ten minutes, and then add cautiously some bicarbonate of soda, either in solution or suspension in warm water, and shake well during the effervescence, taking care that the fluid does not overflow the edge of the beaker. Wash well, pour in with great caution two ounces of nitric acid, and when the effervescence has subsided add one or two pinches of chlorate of potash, and boil for an hour, or until the sediment has become white. If this does not take place in an hour, it might be well to commence the process anew; but so far as the method has been tried, it has never failed. Then wash, and use the ordinary methods for separating the diatoms according to their specific gravities; that of Okedon, as described in Pritchard, is the simplest and best. This process may seem to occupy a great deal of time, and to be very troublesome; but such is not the case, for if the beaker be placed in a metal bath containing a strong solution of chloride of lime, or of common salt, and then placed over the lamp or fire, it will not require continuous watching, and the vessel need only be examined once or twice.—T. G. Stokes, Aughnacloy.—*Quarterly Journal of Microscopical Science.*

THE STARFISH.—All are familiar with the appearance of the Starfish, though few, even of old oystermen accustomed to annual losses from this five-fingered pest, are acquainted with the manner in which it is so destructive. Even writers upon the oyster, whose general information upon this subject should have taught them better, have fallen into the same error of supposing that the taper fingers are introduced between the valves, and, in some mysterious manner, kill and devour the contents. The Starfish is provided with an extensible mouth, situated in the middle of the underside, and can only injure an oyster of a certain size relative to its own. If the oyster is small enough, it is swallowed shell and all; the body is digested, and the shell ejected. But if its victim is a little too large for this operation, Nature has provided this scourge with the power to turn its stomach inside out, envelope the unhappy oyster, and absorb the dainty flesh within by means of gastric juice. A. Agassiz, in "Seaside Studies," speaks of this peculiarity as follows: "These animals have a singular mode of eating; they place themselves over whatever they mean to feed upon, as a cockle-shell for instance, the back gradually rising as they arch themselves above it; they then turn the digestive sac, or stomach inside out, so as to enclose their prey completely, and proceed leisurely to suck out the animal from its shell." When nothing more within the shell remains to be eaten, the stomach is turned back again, and, gifted with a constant and insatiable appetite; the Starfish is ready to recommence its filthy feeding upon the first oyster within its reach. The countless suckers on the underside of this animal are used only for locomotion, just as the fly walks upon the ceiling by means of a similar contrivance on the feet. The general belief that the Starfish takes its nourishment in some mysterious way by means of the suckers is consequently an erroneous one, as they have no openings at the ends, and do not connect in any way with the stomach.—F. W. Fellowes, *The American Naturalist.*

MUSK RATS.—Sir Emerson Tennant gives the following curious story of a procession of musk shrews in *Land and Water*, July 6, extracted from a letter just received from the Rev. Dr. Boake, Principal of Queen's College, Colombo.—"A curious circumstance connected with the habits of the musk rat, came under my observation some time ago. When going up my avenue at an early hour in the morning, I noticed something gliding along the road, the appearance of which puzzled me. It was of a light bluish-grey colour, and its motion resembled that of a snake of about two feet long; its uniform thickness from end to end, however, as well as a certain knobby or lumpy appearance, satisfied me that it could not be a snake. On coming close enough to distinguish it clearly, I found that it consisted of five musk-rats, each holding on to the hind-quarters of the one before it. Being very near-sighted, I was unable to distinguish the nature of the attachment, but the muzzle of each appeared to be in immediate contact with the buttocks of the one before it. I immediately struck at the leader with an umbrella, which I had in my hand, and killed it, but its death did not break up the remainder of the line, which held together until I had killed the whole of them, one after another. On examination, in which I was assisted by two very intelligent friends, we found that the leader was a full-grown female rat, the state of whose teats proved that she was giving suck; the others were nearly full-grown young ones. We could not discover how they had held on to each other, as they had come asunder in dying, and we could find no marks to show the nature of the attachment by which they had held together. I have not been able to discover that any one else had ever witnessed a family party of rats travelling in a similar manner, and my narrative, recording an isolated fact, can be of little value unless it can hereafter be found to fall in with, so as to explain or be explained by, other facts that may have come under the notice of some one else."

DISTRIBUTION OF ANIMALS.—In "Cosmos" there is an article on the distribution of animals over the face of the earth, in which the writer says that mammalia have at all times, in this respect, been observed with the greatest attention. Prince Charles Bonaparte states their number to be 1,149; Minding fixes them higher, at 1,230; Oken at 1,500; so that, taking the average of all these numbers, we may suppose them to be about 1.300. These species are very unequally distributed; monkeys, for instance, are only to be found under the tropics, with very few exceptions; and kangaroos only in Australia. On the other hand, pachydermata, of which the horse is one, exist all over the globe, except in the arctic regions: it must not be forgotten, however, that there were no horses in America until they were imported. Australia also forms an exception in this, as in many other respects; for instance in the case of certain plants that still thrive there, while in our regions they have been extinct for thousands of years, and are now only to be met with in a fossil state at a depth of hundreds of metres. There are not more than 38 species of pachydermata, forming ten genera, among which we may mention the elephant, hippopotamus, rhinoceros, and tapir. And yet, of all mammalia, this class is most numerously represented in the series of fossil animals we possess; and while at present, as we have said above, pachydermata have disappeared from the Arctic regions, it is there, buried in ice, we find their extinct species. The gradual disappearance of species offers matter for curious comment. Thus, the hippopotamus was very common in the Nile at the time Herodotus visited Egypt, that is, about 450 years before our era. Fifteen centuries later it had become much rarer, and Abdallatif, an Arab physician, who flourished in the 12th century, speaks of it as an animal regarded with terror by the inhabitants. Two of them were shown to this writer at Cairo, where they were kept as curiosities, which proves its rarity at the time. But now the hippopotamus has entirely left the Nile, where the inhabitants do not even know it by name: and it is only in the Niger, the Zaira, and other rivers of Africa it is to be found in our days.

COBRA ATTACKED BY A HEN.—I noticed in the last *Field* an account of the rescue of the egg of a Guinea fowl from the interior of a cobra, which egg subsequently was developed into life. Whether or not there exists a mortal feud between the domestic hen and the cobra I am unable to say; but in 1865, when at Mount Lavinia, in Ceylon, my Malay boy rescued from the bill of a common hen a young cobra about twelve inches in length. The fowl had grasped the little reptile behind the hood, and would have killed it very speedily had not my boy interfered. Perhaps it was her intention to devour it; or may be a presentiment of a raid on her eggs, when the reptile arrived at full cobra estate, impelled her simply to destroy, and not to partake of, the little "varmint." I bottled the cobra alive in arrack, and have it by me now, and one can see very distinctly the mark of the mandible of the hen in rear of the hood. A more perfect creature in every way I never beheld. The spectacles are beautifully marked, and I well remember with what fire and energy the little creature went through the whole performance of raising itself on its tail, expanding its tiny hood, and darting forward at a quill pen held a few inches from it. Was it that the feud between the fowl and the cobra tribes was so great, that even the most juvenile of the progeny of the latter resented the presence of one feather of the wing of the former? Shortly after I left the station an officer was bitten in the wrist by a pet cobra, 5ft. 6in. long. "Satan" was the name of the brute, and its owner used periodically to remove its fangs with a pair of nail-scissors. He did not do this effectually just before the time I refer to; and in taking it up by the neck his hand slipped, and the reptile was able to turn round and strike him on the wrist. He recovered by the aid of cauterisation, brandy, and ammonia.

SYMPATHY AMONG HORSES.—A gentleman writing from Australia to *Land and Water*, July 6th, says:—On a cattle station, where I live, near Ipswich, Queensland, I had often noticed two old mares (very old), the one had a fine foal by her side, the other had none. For many years these aged mares had run together; in winter they sought the ridges for shelter, in summer the banks of creeks were their resort. A deserted shepherd's hut stood by a creek, and on nearing it my attention was arrested by the state of agony and despair the foal seemed to be in; for now he would galop round the hut, making the whole valley ring with his piteous appeals, and then would timidly approach it, peeping in it at an opening, and then, as if in utter despair, scamper back to the creek. When I came to the hut one of the mares was outside, standing still, and seemed to take little or no notice of me, while the mother of the foal was lying down (quite naturally) inside the building; her posture was that of a tired horse trying to rest every limb at once. Her ears inclining forwards gave her the appearance of being asleep. I felt so sure she was asleep that I touched her with my whip—no move; again, no stir. So, on closer inspection, I saw she was dead—a death so easy and free from pain that she must have ceased to breathe while sleeping soundly. Her old companion remained upon the same spot, the foal increasing his speed and the eagerness of his cries just in proportion to his hunger. Well, to make my story short, I came again to the spot three days afterwards with my stockman; we saw only the foal outside the hut, the old faithful friend had herself gone and laid down close alongside her former companion and, strange to say, was quite dead also. Their two frames lay one near the other in the deserted hut, and the foal has joined a herd of bush horses, and seems to have quite forgotten his kind old mother.

SPARROWS IN AMERICA.—We learn that two hundred English sparrows were last year domesticated in Union Park, in New York city, and that they completely destroyed the Canker-worms infesting the shade trees. Forty pairs have just been imported into Newhaven. The English Sparrow also feeds very largely on grain, and may prove troublesome to farmers. The attention of the Boston Society of Natural History has been called to the thieving propensities of this bird. "At a meeting of this Society, held April 18th, Dr. Chas. Pickering called attention to the recent introduction of the house sparrow of Europe into this country. As it threatens great evil, preventive measures should be speedily adopted. Proofs of its destructive habits were cited from standard authors, showing that the bird had been the acknowledged enemy of mankind for more than five thousand years. When writing was invented the sparrow was selected for the hieroglyphic character signifying *enemy*. "Sonnini, in the Dictionnaire d'Histoire Naturelle, published in 1817, says:— 'Sparrows are impudent parasites, living only in society with man and dividing with him his grain, his fruit, and his home; they attack the first fruit that ripens, the grain as it approaches maturity, and even that which has been stored in granaries. Some writers have wrongly supposed that the insects destroyed by them compensated for their ravages on grain; eighty-two grains of wheat were counted in the craw of a sparrow shot by the writer, and Rougier de la Bergerie, to whom we owe excellent memoirs on rural economy, estimates that the sparrows of France consume annually ten million bushels of wheat.'"—*The American Naturalist.*

COAL FIELDS.—The principal coal-fields of the Continent of Europe are those of Belgium, France, Spain (in the Asturias), Germany (on the Rhine and Saar, a theme of such prominent bearing upon the ecent warlike demonstrations of France and Germany), Bohemia, Silesia, and Russia (on the Donnetz). The Belgian field is that which shows the most alarming symptoms of giving out. Twenty years, according to the Report of Mr. Dunn, H.M. Inspector of Collieries, will suffice for the catastrophe of Liège and Hainault. The coal of France, though practically inexhaustible, is of an inferior description, and the consumption of English coal becomes an increasing element in the question of the exhaustion of our home supplies. The richest deposits of all other countries combined are insignificant by the side of the coal deposits of North America. There are four principal areas—the great central coal-field of the Alleghanies, those of Illinois, and the basin of the Ohio, the basin of the Missouri, and the wide fields of Nova Scotia, New Brunswick, and Cape Breton. The total produce of the States of the Union for the year 1864 was returned officially as 16,472,410 tons—less than a fifth, after all, of the total produced by the United Kingdom, and not nearly as much again as we can afford to spare for the exigencies of our neighbours. The production of coal in India forms a marked feature in the industrial progress of our great Eastern dependency. It has more than trebled itself in three years, and reached in 1860 nearly 400,000 tons.—*Saturday Review*, July 13.

REASONING IN A HARE.—The following circumstance was related by a respectable farmer as happening within his own observation; and in illustration of its truth it may be proper to remark, that in the country where it happened—in Cornwall—the hills, which are steep, rise so abrubtly and near to each other, that whatever passes on the side of one may be easily discerned on the other. His attention was first drawn to a hare, which he perceived running down a slope, close to the hedge in a field of turnips, and soon afterwards he perceived that in pursuit of her were a couple of dogs. As these dogs entered the field he saw that the hare stopped for a moment and lifted her ears. The pursuers pressed on, but when they had come within little more than a gunshot of their hoped-for prey, the hare stopped, and then ran back for some distance along its former track, when by a sudden spring it threw itself on one side into the midst of the turnips, and there remained crouched and still. The dogs passed onward in their course at a rapid rate; and as soon as they had passed forward on its track, with another bound the hare sprang back to the place it had quitted, and ran upward along the course by which it had come down, with the evident intention of confounding together its upward and downward course. By this time the dogs had come to the lower extent to which the hare had proceeded, and there they stopped, as not knowing what further course to take. It was thus the persecuted creature secured its own safety; and my informant was too generous to help them out of their difficulty.—Video in *Land and Water*, July 13.

WAVES OF LIGHT.—Professor Tyndall states that it requires 39,000 waves of red light placed end to end to form an inch. Multiplying the number of inches in 192,000 miles, viz., 12,165,120,000, by 39,000, gives the tremendous product of 474,439,680,000,000. All these waves enter the eye in a single second of time. To produce the impression of red in the brain, the retina must be hit at this incredible rate. The violet rays being much shorter, it takes 57,000 of them to fill an inch, and the number of shocks required to produce this colour amount to six hundred and ninety-nine millions of millions per second. Sir John Herschel's data differ from these, and show greater disparities of speed between the two ends of the spectrum. Estimating the velocity of white light at 186,000 miles—roughly, one thousand million feet per second, and reckoning 33,866 wave lengths to the inch for the extreme red, 43,197 for the soda yellow, and 70,555 for the extreme violet, the impulses on the retina per second that produce the sensation of these colours reach these numbers:—Extreme red, 399,101,000,000,000; soda yellow 509,069,000,000,000; extreme violet, 831,479,000,000,000. This reveals a difference of more than two to one, while the figures themselves must impress us with the subtlety and inconceivable velocity of the agency with which we have to do.—*Gardeners' Chronicle*, June 29.

AGE OF PARROTS.—A correspondent of the *Field*, July 6, says, there is a green parrot here which was given to my wife in the summer of 1839. The person in Hull from whom she was bought believed her to be about three years old when he parted with her, so that there is no doubt she is now at least thirty-one. She is up to all kind of fun and tricks; at one time laughing, at another crying; now whistling parts of "God save the Queen," and then breaking off with the urgent request, "Fetch the Doctor." She has never been confined in a cage, but lives unchained on a stand, and has not had an hour's illness in her life, which may perhaps be accounted for by the fact that she spends part of every day in the open air. We are old-fashioned people, dining early; and at tea-time, when we have friends with us, both old and young request that Polly may be invited to tea, where she appears to the best advantage, coaxing and wheedling all at the table to give her something, and considering her meal incomplete till she finishes off with a spoonful of cream. She does not seem a year older in respect of constitution than when she came here, twenty-eight years since. Her plumage is as gay and her eyes as bright as ever, and there appears no reason why she should not live as many years as she has already.

RARE BIRDS.—A specimen of that exceedingly beautiful bird, the roller (*Coracias garrula*, Pennant), was recently shot at Howick, in Northumberland, by Mr. C. Lloyd, gamekeeper to Earl Grey. The specimen was about ten inches long—it is now in the possession of Mr. Thomas Gibb, of Alnwick. The roller is a native of the northern parts of Africa. The Rev. F. O. Morris, in his work on "British Birds" records the following instances of its capture in England:—At Skelton Castle, near Redcar, in Yorkshire, July, 1847; at Fixby park, near Huddersfield, in 1824; at Hatfield, near Doncaster, at Halifax, and at Scarborough, in 1832; in Cornwall, in 1844; on the borders of Ashdown Forest in Sussex, and at Oakington, in Cambridgeshire, in 1835; near Newcastle-on-Tyne, North Shields, and Bywell, in 1818; six in Norfolk and Suffolk, the latest in 1838. They have also been twice met with in Ireland and a few in Scotland. The roller is a noisy, clamorous bird. Meyer renders its call by the words "Urah-urah," "Rakker-rakker," and "Crea."—*Land and Water*, June 29th.

NEW VOLCANO IN THE SOUTH SEAS.—The following is an extract from a letter from Mr. J. C. Williams, Her Britannic Majesty's Consul, Navigator's Islands :—"A volcano has broken out at sea, at Manua, about two miles from the island of Olosega. It was preceded by a violent shock of earthquake, which commenced on the 5th of September, and on the 12th dense thick smoke rose out of the sea. Lava was thrown up, discolouring the water for many miles round, and destroying large quantities of fish. Wherever the ashes fell on the adjacent island they destroyed all vegetation. Up to the middle of November dense smoke was still being thrown up, and my informant says that the smoke rose higher than the neighbouring island, which is over 2,000 feet high. We cannot at present ascertain if there is any bank thrown up in the water. Last July we steamed over the place in Her Majesty's ship 'Brisk,' and there were no signs of shoals or anything of the kind."

Remarks, Queries, &c.

(*Under this head we shall be happy to insert original Remarks, Queries, &c.*)

ENTOMOLOGICAL NOTES.—PAPILIO.—This genus attains very large proportions, the colours are varied and brilliant, while a curious feature is often added by the prolongation of the hind wings into two tail-like appendages. The larva is of varied form—sometimes smooth, sometimes covered with fleshy protuberances, sometimes long, and able to throw out at pleasure the first two segments of the body. The genus comprises between two or three hundred known species, among which we find every imaginable tint and gradation of colour, exhibiting occasionally a very bold contrast. In England we have but one specimen, *Papilo Machaon* (Plate, Fig. 2), the beautiful swallow-tailed butterfly; it is the largest of our butterflies, the female occasionally measuring four inches. The base of the upper wing is black, slightly tinged with yellow; the apex of the same colour, with a row of semicircular yellow spots; the margin edged with yellow, spotted with black, forming three large patches, and also broadly marking the nervures; the base of the under wing is yellow, except the inner side, which is black, the nervures being dusky; beyond the yellow portion is a broad black band, marked by faint blue spots and six large yellow crescents; the outer edge is yellow; on the hinder angle is a large round spot of red streaked with blue; the under side resembles the upper. The caterpillar is greenish, with black band on each segment, spotted with red; it feeds on umbelliferous plants. The perfect insect continues until August, and is in some places rather abundant. *Cynthia Cardui*, the Painted Lady (Plate, Fig. 3).—This insect is of large size; it is not very common. The upper wings are tawny brown at the base, ochre-red in the middle, with irregular patch of black; a portion of the apex is also black, with five white spots; near the margin is a series of white crescents and a row of faint yellow spots. Secondary wings the same colour, with three rows of black spots behind—the first composed of five round spots, the second of crescents, and the third of large patches placed on the projecting points; the inner angle has a large black spot, with streak of blue behind. The under side of the primary wing is whitish at the base, and has a large spot, in addition to the corresponding ones on the upper side, tips light brown; the whole tinged with carmine and ochre. The hinder wings variegated with light brown, greyish white, and yellow. The caterpillar is of a brownish-grey colour, with yellow lines on the side, and very spiny; it feeds on the thistle, nettle, and mallow. *Melitæa Euphrosyne*, Pearl-bordered Fritillary.—This butterfly is pretty general, and may be found in August. The wings are yellowish-brown above, blackish at the base, variegated with spots of black, each wing having a row of black spots towards the apex, and a band of the same on the outer margin. The primary wings are yellow underneath, the black spots corresponding with those on the surface, but smaller, tips light yellow. The hind wings have several yellowish spots at the base, the spaces between red, and this colour forms a large spot in the middle; the space between this and the hinder margin is variegated with brown and yellow, and a row of dark spots; the hinder margin has triangular silver spots, forming part of a band of yellowish colour. The caterpillar is black, with lines of orange; it feeds on the violet. *Pieris cratægi*, the Black-veined, White, or Hawthorne Butterfly (Plate, Fig. 1.)—This is a handsome species of a uniform white, with the nervures black; the under side is exactly similar. The caterpillar black when young, but gains a reddish-brown tint, and becomes partially covered with hairs, as its name implies; it feeds on the leaves of the hawthorne, but will attack fruit-trees. It is found principally in the south. *Polyommatus Alexis*, or Common Blue (Plate, Fig. 5).—This is a pretty little insect of a bright lilac blue, the hinder margin edged with black, the anterior edge of upper wing white. The female is brown, powdered with blue at base of wings. The under side in both is brownish ash colour, the upper wings having two ocelli near the body, a slender streak placed transversely, a row of ocelli near the middle, externally a row of crescents edged with reddish-brown; behind these are dark spots on a white ground. The caterpillar is hairy, green in colour, and feeds on grasses. *Lycæna Pheleas*, or Common Copper (Plate, Fig. 6).—The upper wings of this insect are copper-coloured, spotted with black; under pair brownish-black, with copper band dotted with black on its outer edge. The under side of primary wings spotted like the upper, but paler in colour. Secondary wings fawn colour, with indistinct marks. Caterpillar green, with yellow stripe on the back; it feeds on sorrel. Fig. 4 represents the *Audrena nigro ænea*, a species of Bee that makes its nest in banks, excavating a hole of nearly a foot in depth. At the bottom a cell is constructed, which they fill with pollen made into a paste with honey, and in this they deposit their eggs. The colour of the body is black, clothed with tawny-coloured hairs. Antennæ black, wings transparent, legs black and hairy—the hinder pair covered with thick, long, white hair. Fig. 7 is the common May Fly, of greenish-brown colour, with transparent wings, mottled with brown.

BUTTERFLIES.—In answer to R. H., as to the best method of capturing and preserving butterflies, we extract the following from M. E. Catlow's "Popular British Entomology." The entomological net is of various forms and sizes: the one I have used has a pole six feet long, to which is strongly fastened a small hoop of cane to support a green gauze net or bag; by a dexterous turn of the hand, easily acquired by practice, butterflies and other insects may be soon caught on the wing with this simple apparatus. For some of the *Lepidoptera*, such as the Purple Emperor, a much longer rod is necessary, but these will not probably come under the observation of the student until he has acquired some experience, when he will find ways and means for himself. The cane, or hoop, may be about two feet in circumference, and the net half a yard in length. Entomological forceps are also very useful when insects are settled on leaves: these must of course be purchased, so that a description is unnecessary, and they may well be dispensed with for a time; some chip boxes are also useful for putting insects in, when the collector is at a distance from home, that they may not be rubbed by the hand, and the colour injured. The *Lepidoptera* are most easily killed by a slight pressure of the finger and thumb on the thorax, below the wing; this is, at least, generally sufficient; but sometimes, to the great uneasiness of the humane naturalist, they will be found alive some time after; suffocating by means of sulphur is still less certain, and Messrs. Kirby and Spence recommend the following plan:—Fix in the lid of a small tin saucepan filled with boiling water, a tin tube consisting of two pieces, which fit into each other; cover the mouth of the lower one with a piece of gauze, and place your insects upon it, then fix the upper one over it, covering the mouth also with gauze or muslin, and the steam from the boiling water will effectually kill the insects without injuring the plumage. Another more simple apparatus is a piece of elder, or any soft wood with the bark on, placed across the bottom of a mug; stick the insect on this, inverting the mug in a deep basin, into which pour boiling water till it is covered, holding down the mug that it may not be overturned; in two minutes the insect will be dead. This latter plan, however, is objectionable, as the insect can hardly be fixed to the wood by any other means than by running the pin through the thorax when living; and as only experienced naturalists can do this, with the certainty of deadening the feelings of the insect, and at once extinguishing the sense of pain, I would not recommend my readers to practice it. Others advise the head being touched with a strong acid, or that the insect be placed in a covered jar, half filled with bruised laurel-leaves; and beetles may be immediately killed by immersion in boiling water.

This is the only drawback to the study of the delightful science in its perfection, namely, by forming a collection; but it is very evident that insects have not any of the susceptibility to pain that is found in the higher order of animals, for they are frequently seen flying about with apparently the usual sense of enjoyment, when they have been deprived by accident of some of their due proportion of legs or wings; I myself once caught a Tiger-Moth on the wing, which on examination was found to have lost nearly the whole of the lower part of the body. When the insect is killed, it must be prepared for the cabinet: a pin (short whites) should be run into the thorax, and forced sufficiently through to pierce the cork of the box or drawer, and hold the insect firm; it should also be high enough to prevent the legs from touching the bottom. The best method of setting Lepidopterous insects is by having a small board made, with pieces of wood the same length, about three inches wide and half an inch in depth, glued on at intervals of about an inch, or something less; then by sticking the pin with the insect into one of these intervals, the wings rest on the higher parts on each side, and can then be easily fixed with braces in the desired position. The brace is merely a piece of cardboard, long and narrow, fixed with pins into the wood, and bearing gently over the wings so as to keep them steady in their natural attitude; the antennæ and legs should also be extended and kept in their places by pins. When quite stiff and firm, the insects way be removed to their proper place in the cabinet. The best method of arranging insects is in columns, with the generic name at the head of each column, and the specific affixed beneath the insect. A different drawer or box for each order is desirable for the young student, but not indispensable: and these arrangements must depend on means, and increase with his increasing collection. Two of each insect, particularly in *Lepidoptera*, should be procured, if possible, to exhibit both the upper and under side. Should an insect become mouldy, a brush dipped in spirits of wine in which a little camphor is dissolved, will clean it; but the insect must be dried before being replaced in the cabinet. Camphor in the drawers is very necessary to prevent the attacks of other insects, whose presence is easily discovered from the dust under the specimens; when this is seen, they should be taken out, brushed with a camel's hair pencil, then touched with spirits of wine, and placed near the fire till dry. Moths frequently change colour from any oily matter common to all insects; when this is the case, powder some dry chalk on a heated iron, cover it with a fine piece of linen, and apply to it the under part of the insect; the heated iron dissolves the greasy substances, which the chalk then absorbs. Insects, when stiff before being properly placed out, which will sometimes be the case when caught at a distance from home, may be relaxed by being placed on moist sand.

The pupæ are principally found during the first three months of the year, in long grass, on trunks of trees, and felled timber; also in April and May, on pailings. Caterpillars may be discovered in great profusion in May. Butterflies abound in June, July, and August. Moths extend into September.

AN AUDACIOUS MOUSE!—A short time back I was awoke in the middle of the night by some one, as I thought, pulling my hair. I procured a light and looked about, but could perceive nothing, and naturally thought I must have been dreaming. Still I could not get rid of the idea that something had been at my head. I am not superstitious, but certainly felt nervous, so kept the light burning, and lay for some time with my back to the light and face to the wall. I presently fancied I saw the shadow of something move along me from the foot of the bed. I turned quickly round, but could see nothing, so lay on my back with my head raised. I now thought that there might be a rat in the room, but could hear no noise. After several minutes of suspense all ideas were put to flight by what I saw, which was a large mouse climb on the foot of the bed, and, keeping near the wall, stealthily creep up to the pillow; he then made direct, as I fancied, to my face. When quite close I turned sharply round, and he jumped clean over me and fell upon the ground, and I need not say disappeared. Of course it was evident he had got on the bed while I was asleep, and had found the grease on my head so much to his liking that after being frightened away he had made another attempt. I was not over-pleased at the discovery, as you may imagine, so at once removed to another bedroom a story higher, where I slept in peace. But, strange to say, on the following night he, as I presume, found his way up there, for I caught him at the same little game; but in this room he was evidently not so much at home, as after a deal of chasing I captured and consigned him to a pail of water. I know there are plenty of mice in the house, and as I keep a good many birds I am afraid to have a cat, so they multiply and grow fat. But I have never since been troubled in the same way. I have mentioned the circumstance to several persons. No one seems to have ever heard of their coming so close; no doubt the grease was too great a temptation for it to resist. I may mention, as it may be of use to persons troubled with mice, that I lately procured some phosphorous paste to exterminate beetles, and have found four mice dead in the kitchen doubled up, having evidently been feeding off the same. The phosphorus has almost cleared the house of beetles, which was before swarming with them.

Clapham. H. C.

THE JACKDAW.—This well-known bird is much smaller than the rook (being only fourteen inches in length), from which it is easily distinguished by its hood of hoary grey. It is gregarious, and frequents in large numbers holes in rocks, old towers, &c., where it builds a nest of sticks, lined with wool and hair, which I have often seen it stealing from the backs of cattle quietly resting in the meadows, and seeming rather to like the operation than otherwise. In confinement it is a very amusing bird, but is certainly a better trickster than talker; for, although I have tried several, I have not been able to teach one to speak a word. Jackdaws are so fond of liberty that it is a cruel thing to keep them confined in cages, if it can be helped. I have now four which I reared from the nest, all of which have perfect freedom and are allowed to go in and out of their house at will, which is made in the style of a pigeon-house with two holes. It is generally supposed that only birds of prey cast up indigestible food in the shape of pellets, but this I have frequently observed my jackdaws to do. The pellets are in size and shape very like that of the Kestrel or Sparrowhawk. Jackdaws are very fond of bathing, and in warm weather often bathe two or three times a day; therefore a plentiful supply of water should never be withheld from them.

Mavishbush House. J. D. S. W.

CURIOUS SNAKE STORY.—Did you ever read or hear of a mouse eating a live snake—eating him by piecemeal I mean? I was lately out collecting specimens of ferns in the neighbourhood of Sheffield when I caught a very fine specimen of the ring-snake. He was about a yard long, very healthy and vigorous. Well, I could get him to eat nothing. I tried the different things that are supposed to be the food of those reptiles—frogs and toads, snails, grubs, &c., &c. —but not a particle would he eat. At length I put a living mouse into the case; but, to my surprise and indignation, instead of the snake eating the mouse the mouse actually eat the snake. I think I have read somewhere of the South Sea Islanders cutting pieces off the bullock while he was alive. They were offering up sacrifices (so the account read), and first took from the living creature as their superstition directed them. The mouse eat and lived on the snake's tail, and both seemed healthy. Mind, there was plenty of bread and meat both raw and cooked in the case when this took place. I make this statement, which was well known to several of my friends here. I say I record this for fear you should think me cruel in hungering the poor little mouse; such was not the case. It was not from necessity, it was from choice.

Droylesdon. J. POTTS.

[We should like to hear further particulars of this strange story. Has the mouse succeeded in finishing the snake, and is it still alive? Our correspondent will oblige us by sending fuller information.—ED.]

THE DUCK.—This genus comprises upwards of a hundred species, varying considerable in size and plumage from each other. Its inoffensive and harmless character renders it most pleasant and profitable to keep. The habits of the duck are very curious and interesting; their regular parade to and from the pond is a beautiful country spectacle, to be enjoyed by those who have a liking for the charms. The Rhone duck (imported from France) is generally of a dark colour, and is decidedly preferable to our common English, as its flesh is whiter and of a higher flavour. It will cover from eleven to fifteen eggs, and the time of incubation is thirty days; but I think it much more advisable to put duck's eggs under a hen, which makes a far better mother. It is generally supposed that poultry cannot remain long off their eggs without the young being destroyed. But last month I sat a hen on duck's eggs, and when she had sat half her time I kept her off her eggs for about twelve hours, and then put her back again; at the end of her times she hatched all the eggs with the exception of one, which was barren. The ducklings are quite healthy, and are thriving well. The duck on leaving her nest covers the eggs with leaves, which the hen never does. Ducks will not thrive unless they have free access to a pond or running stream.

Mavisbush House. J. D. S. W.

OLD BIRDS FEEDING YOUNG.—Seeing the paragraph in this month's NATURALIST'S NOTE BOOK, headed "Young Canaries fed by an older nestling," I thought the following might not be wholly uninteresting to the readers of the NOTE BOOK.

In the early part of last year a cousin of mine got possession of a nest of four young thrushes just fledged, which he brought up by hand, keeping them in a summer-house which had not been renovated for the season, and all four made fine healthy birds. Some month or so afterwards another nest was obtained, containing five thrushes only just stumped, which he also put into the summer house, and I have with other friends many a time seen the elder birds feed the young ones, four of which were also reared.

S. BENNETT.

BRITISH SHREWS.—It is a daily circumstance with me nearly the whole year through to find the common shrew dead, and sometimes in numbers, in my garden. The explanation which I am accustomed to give, and which I am convinced is the true one, is much more simple and reasonable than the suggestion contained in your last (p. 199). It is well known that the shrew has a fœtid smell, distantly resembling musk; and though the cat will kill this animal whenever found, the prey is soon dropped unmangled on account of its ill odour. A fine old bulldog of my acquaintance, which kills mice with evident enjoyment, will not look at a shrew. THOMAS Q. COUCH.

FLEAS IN DOGS.—J. L.—Experience has taught me that washing dogs once a week with a medicated soap, called "Naldire's Tablet," is much more efficacious in destroying fleas than "Persian Insect Powder." I have used it on both rough and smooth haired dogs, and not only have all fleas been destroyed, but the dogs' coats have at the same time been thoroughly cleansed. Insect powder will not do this.

E. M. W.

BIRDS COUNTERFEITING LAMENESS.—The Partridge is the only bird said to counterfeit lameness and inability to fly in order to lead off a person from the vicinity of its nest; but this is not the case, as I have repeatedly observed other birds (particularly the Blackcap) to act in this manner on their nests being approached. B. W. B.

A WHITE SWALLOW.—When playing on the Co. Louth Cricket Ground to-day I saw a *white* swallow. The bird flew within a yard of me, so that I cannot be mistaken. It was seen also by all those who were playing. Hearne, who takes care of the ground, tells me that it was flying about all day. The bird was perfectly white, or as Hearne says, "just like a white pigeon."

Milesdown, July 19th. T. A. H.

SMOKING BIRDS.—I have heard that smoking tobacco under the nostrils of birds newly caught has the effect of rendering them tame and tractable; but, having tried it, I have met with no success. Perhaps some of your readers could inform me on the subject.

J. D. S. W.

STATE OF THE WEATHER NEAR LONDON.

June and July	Moon's Age.	BAROMETER.		TEMPERATURE.					Wind	Rain.	REMARKS.
				Of the Air.			of the Earth				
		Max.	Min.	Max	Min	Mean	1 foot deep	2 feet deep			
Thurs. 20	18	30.033	29.994	65	44	54.5	60	57	N.E.	.00	Overcast throughout.
Friday 21	19	30.099	30.076	66	44	55.0	60	57	N.E.	.00	Cloudy; overcast; cloudy at night.
Satur. 22	20	30.124	30.043	72	42	57.0	60	57	N.E.	.00	Fine; Slight dry haze; fine; overcast.
Sunday 23	21	29.987	29.932	75	45	60.0	60	56	N.E.	.00	Very fine; fine; very fine at night.
Mon. 24	22	30.025	29.947	70	44	57.0	61	58	N.W.	.00	Fine; overcast; fine at night.
Tues. 25	☾	30.337	30.179	75	42	58.5	62	58	N.E.	.00	Clear and dry; very fine throughout.
Wed. 26	24	30.486	30.468	74	37	55.5	62	59	N.E.	.00	Cold and dry; very clear; very fine at night.
Thurs. 27	25	30.522	30.419	82	40	61.0	61	59	N.E.	.00	Quite cloudless, and very dry air; clear and dry; very fine
Friday 28	26	30.502	30·474	70	35	52.5	63	59	N.E.	.00	Overcast; scattered low dusky clouds; very fine at night.
Satur. 29	27	30.408	30.273	80	42	61.0	62	60	S.W.	.00	Quite cloudless; very fine; cloudy at night.
Sunday 30	28	30.079	29.860	82	47	64.5	63	60	S.W.	.00	Hot; very fine throughout.
Mon. 1	●	29.819	29.733	83	44	63.5	64	60	E.	.24	Hot, with slight dry haze; hot and dry; cloudy; rain.
Tues. 2	1	29.735	29.654	71	55	63.0	65	61	W.	.04	Close and warm; dull and showery; fine rain.
Wed. 3	2	29.968	29.787	74	55	64.5	64	61	S.	.14	Overcast and warm; rain at night.
Thurs. 4	3	29.856	29.848	72	52	62.0	64	61	S.	.02	Rain; cloudy, with showers; overcast; warm at night.
Friday 5	4	30.072	29.979	71	41	56.0	64	61	S.W.	.00	Fine, with white clouds; very fine throughout.
Satur. 6	5	30.133	30.131	74	42	58.0	64	61	N.W.	.00	Fine; very fine; fine at night.
Sunday 7	6	30.232	30.224	76	42	59.0	64	61	N.	.00	Very fine throughout; rather cold at night.
Mon. 8	☽	30.245	30.158	77	42	59.5	64	61	N.E.	.00	Slight dry haze; very fine at night.
Tues. 9	8	30.305	30.114	77	44	60.5	64	61	N.E.	.00	Very fine throughout.
Wed. 10	9	30.198	30.137	79	41	60.0	64	61	S.E.	.00	Very fine; hot and very fine; cold at night.
Thurs. 11	10	30.122	29.990	73	53	65.0	64	61	E.	.00	Fine; with slight dry haze; very fine; overcast.
Friday 12	11	29.859	29.751	73	46	61.0	64	61	E.	.00	Overcast; fine, with dry haze; fine at night.
Satur. 13	12	29.767	29.688	72	52	62.0	64	61	S.	.26	Overcast; showery at night.
Sunday 14	13	29.769	29.595	71	48	59.5	64	61	S.	.09	Very fine; showery; very fine.
Mon. 15	14	29.589	29.352	65	54	59.5	64	61	S.	.28	Rain; showers and dense dark clouds; boisterous.
Tues. 16	○	29.497	29.487	67	57	62.0	63	60	S.	.27	Showers, and dense clouds; very heavy showers; fine.
Wed. 17	16	29.727	29.623	70	56	63.0	62	60	W.	.32	Boisterous; masses of white clouds in bright blue sky; cloudy.

MIMICRY IN NATURE.

IT is among butterflies that instances of mimicry are most numerous and most striking. There is in South America an extensive family of these insects, the Heliconidæ, which are in many respects very remarkable. They are so abundant and characteristic in all the woody portions of the American tropics, that in almost every locality they will be seen more frequently than any other butterflies. They are distinguished by very elongate wings, body, and antennæ, and are exceedingly beautiful and varied in their colours; spots and patches of yellow red or pure white upon a black, blue, or brown ground, being most general. They frequent the forests chiefly, and all fly slowly and weakly; yet although they are so conspicuous, and could certainly be caught by insectivorous birds more easily than almost any other insects, their great abundance all over the wide region they inhabit shows that they are not so persecuted. It is to be especially remarked also that they possess no adaptive colouring to protect them during repose, for the under side of their wings presents the same, or at least an equally conspicuous colouring as the upper side; and they may be observed after sunset suspended at the end of twigs and leaves where they have taken up their station for the night, fully exposed to the attacks of enemies if they have any. These beautiful insects possess, however, a strong pungent semi-aromatic or medicinal odour, which seems to pervade all the juices of their system. When the entomologist squeezes the breast of one of them between his fingers to kill it, a yellow liquid exudes which stains the skin, and the smell of which can only be got rid of by time and repeated washings. Here we have probably the cause of their immunity from attack, since there is a great deal of evidence to show that certain insects are so disgusting to birds that they will under no circumstances touch them. Mr. Stainton has observed that a brood of young turkeys which greedily eat up all the worthless moths he had amassed in a night's "sugaring," yet one after another seized and rejected a single white moth which happened to be among them. Young pheasants and partridges which eat many kinds of caterpillars seem to have an absolute dread of that of the common currant moth, which they will never touch, and tomtits as well as other small birds appear never to eat the same species. In the case of the Heliconidæ, however, we have some direct evidence to the same effect. In the Brazilian forests there are great numbers of insectivorous birds—as jucamars, trogons, and puffbirds—which catch insects on the wing, and that they destroy many butterflies is indicated by the fact that the wings of these insects are often found on the ground where their bodies have been devoured. But among these there are no wings of Heliconidæ, while those of the large showy Nymphalidæ, which have a much swifter flight, are often met with. Again, a gentleman who has recently returned from Brazil stated at a meeting of the Entomological Society that he once observed a pair of puffbirds catching butterflies, which they brought to their nest to feed their young; yet during half an hour they never brought one of the Heliconidæ, which were flying lazily about in great numbers, and which they could have captured more easily than any other. It was this circumstance that led Mr. Bolt to observe them so long, as he could not understand why the most common insects should be altogether passed by. Mr. Bates also tells us that he never saw them molested by lizards or predacious flies which often pounce on other butterflies.

If, therefore, we accept it as highly probable (if not proved) that the Heliconidæ are very greatly protected from attack by their peculiar odour and taste, we find it much more easy to understand their chief characteristics—their great abundance, their slow flight, their gaudy colours, and the entire absence of protective tints on their under surfaces. This property places them somewhat in the position of those curious wingless birds of oceanic islands, the dodo, the apteryx, and the moas, which are with great reason supposed to have lost the power of flight on account of the absence of carnivorous quadrupeds. Our butterflies have been protected in a different way, but quite as effectually; and the result has been that as there has been nothing to escape from, there has been no weeding out of slow flyers, and as there has been nothing to hide from, there has been no extermination of the bright-coloured varieties, and no preservation of such as tended to assimilate with surrounding objects.

Now let us consider how this kind of protection must act. Tropical insectivorous birds very frequently sit on dead branches of a lofty tree, or on those which overhang forest paths, gazing intently around, and darting off at intervals to seize an insect at a considerable distance, which they generally return to their station to devour. If a bird began by capturing the slow-flying, conspicuous Heliconidæ, and found them always so disagreeable that he could not eat them, he would after a very few trials leave off catching them at all; and their whole appearance, form, colouring, and mode of flight is so peculiar, that there can be little doubt birds would soon learn to distinguish them at a long distance, and never waste any time in pursuit of them. Under these circumstances, it is evident that any other butterfly of a group which birds were accustomed to devour, would be almost equally well protected by closely resembling a Heliconia externally, as if it acquired also the disagreeable odour; always supposing that there were only a few of them among a great number of the Heliconias. If the birds could not distinguish the two kinds externally, and there were on the average only one eatable among fifty uneatable, they would soon give up seeking for the eatable ones, even if they knew them to exist. If, on the other hand, any particular butterfly of an eatable group acquired the disagreeable taste of the Heliconias while it retained the characteristic form and colouring of its own group, this would be really of no use to it whatever; for the birds would go on catching it among its eatable allies (among whom, we suppose, it is comparatively rare), and it would probably be wounded and disabled, even if rejected, and would be as effectually killed as if it were devoured. It is important, therefore, to understand that if any one genus of an extensive family of eatable butterflies were in danger of extermination from insect-eating birds, and if two kinds of variation were going on among them, some individuals possessing a slightly disagreeable taste, others a slight resemblance to the Heliconidæ, this latter quality would be much more valuable than the former. The change in flavour would not at all prevent the variety from being captured as before, and it would almost certainly be thoroughly disabled before being rejected. The approach in colour and form to the Heliconidæ, however, would be at the very first a positive, though perhaps a slight advantage; for although at short distances this variety would be easily distinguished and devoured, yet at a longer distance it might be mistaken for one of the uneatable group, and so be passed by and gain another day's life, which might in many cases be sufficient for it to lay a quantity of eggs and leave a numerous progeny, many of which would inherit the peculiarity which had been the safeguard of their parent.

Now, this hypothetical case is exactly realized in South America. Among the white butterflies forming the family Pieridæ (many of which do not greatly differ in appearance from our own cabbage butterflies) is a genus of rather small size (Leptalis); some species of which are white like their allies, while the larger number exactly resemble the Heliconidæ in the form and colouring of the wings. It must be always remembered that these two families are as absolutely distinguished from each other by structural characters as are the carnivora and the ruminants among quadrupeds, and that an entomologist can always distinguish the one from the other by the structure of the feet, just as certainly as a zoologist can tell a bear from a buffalo by the skull or by a tooth. Yet the resemblance of a species of the one family to another species in the other family was often so great, that both Mr. Bates and Mr. Wallace were many times deceived at the time of capture, and did not discover the distinctness of the two insects till a closer examination detected their essential differences. During his residence of eleven years in the Amazon valley Mr. Bates found a number of species or varieties of Leptalis, each of which was a more or less exact copy of one of the Heliconidæ of the district it inhabited; and the results of his observations are embodied in the paper published in the Linnean Transactions, in which he first explained the phenomena of "mimicry" as the result of natural selection, and showed its identity in cause and purpose with protective resemblance to vegetable or inorganic forms.

The imitation of the Heliconidæ by the Leptalides is carried out to a wonderful degree in form as well as in colouring. The wings have become elongated to the same extent, and the antennæ and abdomen have both become lengthened, to correspond with the unusual condition in which they exist in the former family. In colouration there are several types in the different genera of Heliconidæ. The genus Mechanitis is generally of a rich semi-transparent brown, banded with black and yellow; Methona is of large size, the wings transparent like horn, and with black transverse bands; while the delicate Ithomias are all more or less transparent, with black veins and borders, and often with marginal and transverse bands of orange red. These different forms are all copied by the various species of Leptalis, every band and spot and tint of colour, and the various degrees of transparency, being exactly reproduced. As if to derive all the benefit possible from this protective mimicry, the habits have become so modified that the Leptalides generally frequent the very same spots as their models, and have the same mode of flight; and as they are always very scarce (Mr. Bates estimating their numbers at about one to a thousand of the group they resemble), there is hardly a possibility of their being found out by their enemies. It is also very remarkable that in almost every case the particular Ithomias and other species of Heliconidaæ which they resemble, are noted as being very common species, swarming in individuals, and found over a wide range of country. This indicates antiquity and permanence in the species, and is exactly the condition most essential both to aid in the development and to increase the utility of the resemblance.

But the Leptalides are not the only group who have prolonged their existence by imitating the great protected group of Heliconidæ;—a genus of quite another family of most lovely small American butterflies, the Erycinidæ, and three genera of diurnal moths, also present species which often mimic the same dominant forms, so that some, as Ithomia ilerdina of St. Paulo, for instance, have flying with them a few individuals of three totally different insects, which are yet disguised with exactly the same form, colour, and markings, so that all four are undistinguishable when on the wing. Again, the Heliconidæ are not the only group that are imitated, although they are the most frequent models. The black and red group of South American Papilios, and the handsome Erycinian genus Stalachtis, have also a few who copy them; but this fact offers no difficulty, since these two groups are almost as dominant as the Heliconidæ. They both fly very slowly, they both are conspicuously coloured, and they both abound in individuals; so that there is every reason to believe that they possess a protection of a similar kind to the Heliconidæ, and that it is therefore equally an advantage to other insects to be mistaken for them. There is also another extraordinary fact that we are not yet in a position clearly to comprehend: some groups of the Heliconidæ themselves mimic other groups. Species of Heliconius mimic Mechanitis, and every species of Napeogenes mimics some other Heliconideous butterfly. This would seem to indicate that the distasteful secretion is not produced alike by all members of the family, and that where it is deficient protective imitation comes into play. It is this, perhaps, that has caused such a general resemblance among the Heliconidæ, such a uniformity of type with great diversity of colouring, since any aberration causing an insect to cease to look like one of the family would inevitably lead to its being attacked, wounded, and exterminated, even although it were not eatable.

In other parts of the world an exactly parallel series of facts have been observed. The Danaidæ and the Acræidæ of the Old World tropics form in fact one great group with the Heliconidæ. They have the same general form, structure, and habits: they possess the same protective odour, and are equally abundant in individuals, although not so varied in colour, blue and white spots on a back ground being the most general pattern. The insects which mimic these are chiefly Papilios and Diademæ, a genus allied to our peacock and tortoiseshell butterflies. In tropical Africa there is a peculiar group of the genus Danais, characterized by dark-brown and bluish-white colours, arranged in bands or stripes. One of these, Danais niavius, is exactly imitated both by Papilio hippocoon and by Diadema anthedon; another, Danais echeria, by Papilio cenea; and in Natal a variety of the Danais is found having a white spot at the tip of wings, accompanied by a variety of the Papilio bearing a corresponding white spot. Acræa timandra is copied in its very peculiar style of colouration by Papilio boisduvalianus and the female of Diadema hirce, while the male of the same insect is like Acræa gea. Acræa euryta of Sierra Leone has a Diadema from the same place which exactly copies it; and in the collections of the British Museum there are six species of Diadema and four of Papilio which in their colour and markings are perfect mimics of species of Danais or Acræa which inhabit the same districts.

Passing on to India, we have Danais tytia, a butterfly with semi-transparent bluish wings and a border of rich reddish brown. This remarkable style of colouring is exactly reproduced in Papilio agestor and in Diadema nama, and all three insects not unfrequently come together in collections made at Darjeeling. In the Philippine Islands the large and curious Idea leuconöe with its semi-transparent white wings, veined and spotted with black, is copied by the rare Papilio idæoides from the same islands.

In the Malay archipelago the very common and beautiful Euplæa midamus is so exactly mimicked by two rare Papilios (P. paradoxa and P. ænigma) that Mr. Wallace generally caught them under the impression that they were the more common species; and the equally common and even more beautiful Euplæa rhadamanthus, with its pure white bands and spots on a ground of glossy blue and black, is reproduced in the Papilio caunus. Here also there are species of Diadema, imitating the same group in two or three instances; but we shall have to adduce these further on in connexion with another branch of the subject.

It has been already mentioned that in South America there is a group of Papilios which have all the characteristics of a protected race, and whose peculiar colours and markings are imitated by other butterflies not so protected. There is just such a group also in the East, having very similar colours and the same habits, and these also are mimicked by other species in the same genus not closely allied to them, and also by a few of other families. Papilio hector, a common Indian butterfly of a rich black colour spotted with crimson, is so closely copied by Papilio romulus, that the latter insect has been thought to be its female. A close examination shows, however, that it is essentially different, and belongs to another section of the genus. Papilio antiphus and P. diphilus, black swallow-tailed butterflies with cream-coloured spots, are so well imitated by varieties of P.

theseus, that several writers have classed them as the same species. Papilio liris, found only in the island of Timor, is accompanied there by P. ænomaus, the female of which so exactly resembles it that they can hardly be separated in the cabinet, and on the wing are quite undistinguishable. But one of the most curious cases is the fine yellow-spotted Papilio cöon, which is unmistakeably imitated by the female tailed form of Papilio memnon. These are both from Sumatra; but in North India P. cöon is replaced by another species, which has been named P. doubledayi, having red spots instead of yellow; and in the same district the corresponding female tailed form of Papilio androgeus, sometimes considered a variety of P. memnon, is similarly red-spotted. Mr. Westwood has described some curious day-flying moths (Epicopeia) from North India, which have the form and colouring of Papilios of this section, and two of these are very good imitations of Papilio polydorus and Papilio varuna, also from North India.—*Westminster Review*, July 1867.

DEW.

WHEN substances exposed to the open air become covered with moisture, at a time when no rain or visible wet is falling, the phenomenon is called *dew*. If a glass of cold water be brought into a warm room, the surface of the glass becomes bedewed. In like manner the windows of a room, especially where many persons are collected and lights are burning, become covered with dew, often in such quantity as to run down in streams of water. So also after sunset, when the sky is clear, the earth cools down more rapidly than the air that rests upon it, and condenses the moisture of the air so as to form dew. If a thermometer be suspended in the air a few feet above the ground under a clear sky by night, it will mark a higher temperature by four, six, or eight degrees, or more, than a thermometer resting on the ground; and what is very remarkable, the difference between the two thermometers will vary with the nature of the surface on which the thermometer is placed. The thermometer resting on long grass will mark a much lower temperature than one placed on garden mould, and this will be much lower than a thermometer placed on gravel; so that at the same moment we may have a copious deposit of dew on grass, where it is most wanted, a smaller deposit on mould, and least of all on the gravel path, where it is but little wanted. Here we have another of those striking instances of design which we have had occasion to point out in other papers.

The formation of dew is intimately connected with the operation of two great natural forces which are in constant activity everywhere around us; namely, the *radiation of heat*, whereby the surface of the earth becomes colder than the surrounding air, and the *condensation of vapour* from the atmosphere by contact with a colder body. Should the temperature of the air be below the freezing point of water, and circumstances be otherwise favourable for the deposition of moisture, *hoar frost* will be formed.

It often happens that after a true theory has been established the incorrect language of an older erroneous theory is retained. This happens in the case of dew. It was formerly supposed that the air dissolved moisture, as water dissolves a salt, sugar, &c. By stirring up the salt or the sugar in water a certain quantity will be dissolved, and when the water will dissolve no more it is said to be saturated. By raising the temperature of the water, we increase, in the majority of cases, its solvent powers, and it again becomes saturated at a higher temperature. By cooling the solution it throws down some of the salt: by reheating it, it takes it up again. Now although the quantity of vapour in the air depends on the temperature, and we speak of the air as being more or less saturated with moisture, yet there is no relation between moisture and the air in the sense that a soluble salt bears to water. Were there no atmosphere, moisture would be formed in greater or less quantities according to the temperature. It would be abundant, highly elastic, and invisible at a high temperature; it would be scanty and have little elasticity at a low temperature. Under any circumstances, whether air be present or not, vapour would be visible only while it was in that state of partial condensation which we recognize as cloud, mist, or fog.

The moisture of the air then, forming as it does an independent atmosphere of itself, can be examined without reference to the other ingredients in the earth's complex gaseous envelope. It is exceedingly sensitive to minute changes in temperature, imparting thereby such wondrous beauty to the sky, softening the air, ministering to the comfort and sustenance of animals and plants, drenching the latter with dew, and thus fulfilling the office of rain, and at lower temperatures covering vegetation with icy feathers of exquisite beauty.

The first thing to be considered in the formation of dew is the source of supply in the invisible vapour of the air. At the freezing point of water the air can contain enough moisture to support two-tenths of an inch of mercury in the barometer. At thirty-nine degrees there can be moisture enough to support about one-fourth of an inch; at fifty-nine degrees half an inch; at seventy-one degrees three quarters of an inch;

at eighty degrees one inch, and so on, the quantity depending strictly on the temperature.

The second point to be considered is the mode in which bodies heated by the sun or otherwise cool down when the source of heat is removed. Bodies may cool by *conduction*, as when a warm body, in contact with a colder one, parts with its heat to the colder one without travelling except from particle to particle until the two bodies are of the same temperature; secondly, by *convection*, as when a fluid body, such as air or a liquid near a hot body has a few of its particles heated, and these ascend while colder particles take their place to be heated, and in like manner to ascend, which process goes on until equilibrium of temperature between the heated body and the fluid is attained; thirdly, by *radiation*, in which the heated body parts with its heat in radial lines which travel into space with the velocity of light, but if they encounter other bodies capable of reflecting them back the process of radiation may be impeded or arrested. The fire warms our rooms by radiation, the candle gives us heat and light by radiation, our bodies cool by radiation, and this process is perpetually going on among all kinds of matter, radiating heat to each other, and tending to establish that equilibrium of temperature which is never attained. If a heated cannon-ball be brought into a room, it will dart its rays in all directions, and raise the temperature of all the objects around it. If a lump of ice be similarly placed the objects in the room will radiate heat to it until it is melted, but in both cases the process is one of interchange. Both the cannon ball and the ice receive heat from the objects in the room, but the one gives out much more and the other much less than it receives. The radiating powers of bodies are however very unequal. If we call the radiating power of long grass 1000, that of hare skin is 1316, raw white wool 1222, raw silk 1107, unwrought white cotton wool 1085, lamp black 961, flannel 871, coloured lamb's wool 832, black lamb's wool 741, snow 657, sheet iron 642, paper 614, slate 573, river sand, 454, stone, 390, brick 372.

The power of condensing moisture from the air will thus, it is evident, depend on the radiating power of the body in question. Some bodies will cool and contract dew more quickly than others; that is, they will cool down sufficiently to condense moisture from the air in the form of dew. The temperature at which the vapour of the air begins to be condensed is called the *dew-point.* One of the earliest methods of finding the dew-point consisted in pouring water, colder than the atmosphere, or made so by the addition of a little nitre or sulphate of soda into a thin glass tumbler and exposing it to the air. If dew appeared immediately and abundantly on its surface the water was poured into another vessel, and allowed to approach nearer the temperature of the air. It was then poured back into the glass, and if the dew still formed abundantly the water was again poured into another vessel, so as to get warmer, until at length that temperature was obtained at which moisture would just be deposited on the surface of the thin glass, but if the water were one degree higher, moisture would not be condensed. Instruments called *hygrometers* have been contrived for ascertaining the dew-point, while those which merely indicate the presence of moisture, more or less, are termed *hygroscopes.* The twisted fibres of hemp, catgut, &c., are thus used, as they shrink and contract by moisture, and open and get longer in dry weather. A hair, an oat beard, Indian grass, &c., are also used. For accurate observation, as well as convenience, the *wet* and *dry-bulb thermometers* are now chiefly used. Two thermometers are mounted in one frame, the bulb of one of which is covered with cambric, and a thread of cotton is led from this into a reservoir of water, which thus keeps the cambric constantly wet; and as the moisture evaporates it produces a depression of temperature in this thermometer as compared with the other, and as the evaporation and consequent depression is greater in a dry air than in a moist, the difference between the two thermometers is constantly varying. In "Glaisher's Meteorological Tables" factors are given for multiplying the excess of the reading of the dry thermometer over that of the wet, and this gives the excess of the temperature of the air above that of the dew-point.—*People's Magazine* for August.

THE GEOLOGY OF HAMPSHIRE.

THE great chalk range which forms the boundary to Northern Hampshire, so far as it concerns the district around St. Mary Bourne, may be said to commence with the Hippenscombe and Buttermere hills westward, and to terminate at Cottington Hill, near Kingsclere, eastward. It comprehends in its course the Inkpen Beacon, which attains to an elevation of about 1,000 feet above the level of the sea, and the more or less continuous hills of Coombe, Walbury, Sidon, and Highclere Beacon. These magnificent hills are interesting from their historical associations, and the remarkable remains in the shape of earthworks, &c., which crown most of their summits, testifying that they must have been strongholds to various tribes of people at different periods in the past history of the county. Most of these entrenchments are of considerable extent, the one on Ladle Hill enclosing an area of about eight acres. On Beacon Hill, within a large enclosed space, there are some peculiar elevations, nearly circular in outline, and rudely pitched with stones. They are considered as hut-circles, possibly the work of the Belgic Britons, who were chiefly located in this part of Hampshire. This hill commands a fine view of the bold and rugged downs around Litchfield, rich in associations if bare in feature, the tumuli dotted about their surface marking the burial places of an early people; while the extended lines of entrenchments, observable on commanding elevations, were used for defensive purposes, probably by the various people who have successively occupied Britain.

Litchfield is stated as signifying "the field of corpses," perhaps from the Saxon *lic*, flesh; the blood of the Saxon having, it is supposed, been freely spilt here in battle. But from the way the word is written in ancient documents, it is quite as likely to be of Celtic origin, and to have nothing to do with the dead. The name has been introduced in order to show the remarkable alterations a word may undergo in the course of a few centuries. Thus, in the Hampshire Doomsday, it appears as Liveselle. In Pope Nicholas's Taxation it is called *Lindeshull.* In the year 1300, it is known as *Lidescelve.* In the Subsidy Roll of Hampshire, A.D. 1327, it assumes the name of *Ludeshulve.* In 1340 it is written *Lideshulve*, and lastly, in 1477, it occurs under the title of *Ludchelfe.* These words are evidently modifications of each other. How it became, subsequently, Litchfield, it is difficult to determine, but, at all events, the transposition appears to have taken place since Saxon times.

Returning to the boundary chain, it may be briefly stated that, on the Hampshire side, the chalk has a gradual dip southwards, the general drainage being consequently in the same direction. On the north of Berkshire side the drainage is in the opposite direction, or towards the Kennet. Here the dip of the chalk is more abrupt than on the south side.

The Upper Test, or Bourne Valley, with its tributaries, are the chief lines of drainage to that portion of the range extending from Walbury to Beacon Hill.

The district consists of Upper and Lower Chalk, the former abounding in flints, the latter being flintless, or containing only occasional nodules. The Upper Chalk is hardly so fine and soft as in some districts, the Sussex Upper Chalk, for instance; and in some cuttings it has a slightly brownish tinge, which is probably due to saturation with water, wet chalk being always more clayey looking than dry. The Upper Chalk of this district would have continued as a sealed book, but for the timely exposure of a portion of it in section by the excavations, now for some time in operation, on the iron-way from London to Exeter. The portion of which my attention in fossil-collecting has been directed, extends for about three miles, from Whitchurch, eastward, to the Devil's Dyke, near Andover, westward. In short, about one mile of chalk on each side of the Test Valley from Chapmansford, at which point the railway crosses the valley. The excavation during this short distance passes through a series of chalk undulations, the depth in the deepest cutting being about 30ft. perpendicular from the surface. The layers of flints follow the same horizontal planes as the chalk, with few exceptions, where the uniformity is broken by the flints being thrown out of their lines of stratification. In these places the chalk has a disturbed, rubbly appearance, for a considerable depth, and is much fissured, the cracks being filled with clay and flint-gravel washed in from the surface. From the clay, water containing iron has infiltrated the chalk, veining it in various directions with reddish-ochreous lines. Fossils taken from these places are usually broken, and very rotten.

With such a favourable opportunity for collecting, the fossils are by no means plentiful, although, as will be seen by the subjoined list, they furnish a tolerable variety of species. It should be remarked that they do not occur indiscriminately mingled in the chalk, but appear to be present in zones, different kinds of remains predominating at different sections; while at intervals there is an almost total absence of organic remains. Following this generalization, the chalk at Whitchurch, which is best observed at a large whiting factory, is peculiar for the abundance of sponge remains, not in the chalk itself, but almost confined to the nodular flints. About a mile from Whitchurch, westward, at the cutting near New-Barn, and occupying the short space of about forty yards in length at the base of the section, Echini of a good many species are abundant. A little further on and *Encrinites* predominate, with small *Zoophytes.* Then follows a blank for a considerable distance, till at one part of the Green-Hill cutting, on the west of the Test Valley, a few sponges, with broken valves of *Inocerami* and *Spondyli* occur. From this point to the Dyke, the chalk again becomes comparatively barren. The chief fossil distinction between the Upper and Lower Chalk is the much greater frequency of *Echinoderms* in the upper, and *Terebratulæ* in the lower cretaceous deposit.

Of the fossils demanding special notice, a few words might be said respecting fossil-wood, of which several good specimens have been met with. A large lump from the New-Barn cutting is *Coniferous*, and its tissues are quite siliceous. It has much the character of the Pine-wood from the older secondary rocks, as the Upper Oolite, from which it is thought that most of the fossil-wood of the chalk is derived. Waterworn specimens of similarly fossilized wood have been found in the white chalk of Sussex.

The *Echinoderms,* commonly known as Shepherds'-crowns—the prickly sea-urchins being their living representatives—are very well typified ; but it is rarely that the test and spines are found in contiguity. An unspined sphere of *Syphosoma* is a fine specimen, seven inches in circumference. *Cidaris clavigera* and *sceptrifera* occur more frequently than any other species, and they are occasionally attended with spines. *Micraster gibba*, *Ananchites hæmispherica*, and *Galerites conica* are fine examples of the commoner Echini.

Representatives of another elegant tribe of fossils, the Star-fishes, are found. Some of these have simply pentagonal bodies, the rays being reduced to mere angles. They are popularly known as "cushion-stars." Remains of such in good form are rare here, although detached angles, with marginal plates, and ossicles of the disk, are not unfrequently distributed in lumps of chalk, and attached to the surface of flints. Tolerably good examples of the commoner species, *uncatus* and *Parkinsoni*, are found. Of the Star-fishes with extended arms, one specimen only has been discovered, and this is quite one in miniature, it being almost a microscopic *Ophiura serrata.* The little fellow, with his flexible rays, lies contorted on a bit of chalk of about the dimensions of a sixpence. It is a very graceful species, the disk being small, and the serrated arms long and whip-like—the serrations being due to the plates of the skeleton overlapping each other like the tiles on a house.

A few detached plates, and portions of a stem of *Pentacrinus*, are all that have been found of this species ; but *Apiocrinus* is more abundant, one lump of chalk of great size occurring with a quantity of diffused ossicles, broken stems, heads, and arm-digitations of this interesting sea-lily. The men working on the railway appear to be familiar with this species under the name of "bottle." The ossicles or joints of the Pentacrinite are more beautiful objects than those of the Apiocrinite, or Pear-lily—the former being pentagonal, as its name implies, while in the latter the plates are round or oval.

Fish remains are chiefly represented with teeth, although jaws with maxillary teeth of two species, for which I have no name, have occurred. The teeth of *Corax*, *Otodus*, *Lamna*, and *Oxyrhina* are sharp, death-inflicting instruments ; the Otodus tooth having lesser teeth at its bass to render its destructive powers more deadly. *Ptychodus* teeth, on the contrary, although equally well adapted for the purposes for which they were made, are flattish, or more or less conical, and fluted, and are in small squarish blocks, with which the mouth and palate of the fish were paved, to enable them to crush shell-fish and sea-urchins.

The *Bryozoa* specified in the list are of almost microscopic minuteness, and are generally found encrusting the surfaces of other shells. From their manner of attaching themselves in irregular clusters to other objects, they have received the name of "sea-mosses," or "mats." Those mentioned under the heads of *Flustra*, *Escharina*, &c., were found on the tests of sea-urchins, and when examined with a common hand-glass look like lace or crochét work ; while *Alecto ramea* spreads itself over shells in the form of delicate sprays, branching out in various directions.

Foraminiferous remains again are very frequently microscopic, and are so minute that millions are required to make up a single cubic inch of chalk. When powerfully magnified they are found to appear in a variety of shapes, some of them having much the appearance of Ammonite shells. Until recently, when their life history was less known, they were placed by naturalists with Gasteropodous and other shells. Many rocks, as well as the deep sea-beds in all parts of the world, are composed of microscopic bodies, of which the *Foraminifera* form a large part. And as chalk is a deep-sea deposit, it is not surprising that the bulk of it should contain a large per-centage of these remains. The ooze, or deep-sea mud brought up on the grapnel, in recovering the Atlantic cable of 1865, in mid-ocean, at a depth of over 2,000 fathoms, was found to contain abundance of foraminiferous shells in a mutilated condition, showing that they were drifted specimens. Of four slides prepared for the microscope, about three fourth of the remains were organic, the remainder amorphous. Of the organic the greater portion was composed of the genera *Rotalia* and *Textularia*, with a small per-centage of the flinty remnants of *Diatomaceæ*, chiefly *Coscinodisci*. This last is a likely form to be present in deep sea mud, inasmuch as it is one which lives freely in the ocean. A few needle-shaped sponge spicules were also observed.

Of the non-microscopic *Foraminifera*, *Orbitolina globularis* is an interesting example. It is found in both the upper and lower cretaceous deposits of this neighbourhood as well as in flint, but is more common in the Upper Chalk. In size it varies from that of a pea to a large nut, and is sometimes partially bored, and occasionally entirely perforated ; and as it makes its way from the chalk-flints into the drift-gravel, it is thought, being occasionally perforated, to have been used by the early flint-working people of the drift-period to form necklaces, and hence it has been named the "fossil-bead." In an article on the Foraminifera, in the "*Annals of Natural History*" for 1860, the following occurs relative to the so-called "beads":—"In some of the figured specimens of *Orbitolini globularis* the not unusual hole in the base is indicated. Occasionally individuals are perforated by a more or less irregular tubular cavity. The roundness of the specimens, and their holes and tubular cavities, appear to have suggested to the old 'flint-folk' of the valley of the Somme that they might be used for beads; for such perforated *Orbitolinæ* are frequent in the gravels that yield the flint axes." I am not aware that there are any reasons for supposing that these little objects ever were adopted as ornaments by the ancient Celts, although, as in the case of other uncivilized races, they doubtless availed themselves of any pretty natural objects for that purpose which came in their way. The more likely suggestion as to the way the holes in the Orbitolinæ occurred is that they grew around the stem of some marine plant.

Chalk fossils have, however, furnished examples of the application made of them by pre-historic tribes, joints of Pentacrinites and a Cidaris having been discovered in tumuli in the neighbourhood of Salisbury. They were found artistically perforated, and had in all probability served as ornaments to the persons in whose tombs they were discovered.—*Flint Implements of St. Mary Bourne*, by J. Stevens. London: Tennant.

TUMBLERS.

THE Rev. E. S. Dixon, in "The Dovecote and the Aviary," in his usually pleasant and lively style, thus describes the habits of the ordinary flying Tumbler:—

"Of all the Doves that cleave the air, give me, *in its unsophisticated and vulgarly bred state*, the pretty little Tumbler. Birds at two or three shillings the pair are better than those at two or three guineas, in spite of the 'Treatise;' the learned author of which we may magnanimously gainsay, without fear of contradiction, as he is long since quiet in his grave. The Tumbler, whether you Frenchify it as the *Pigeon Calbutant*, or Latinize it as the *Columba gyratrix*, is sure to attract notice for its intrinsic excellencies. Do you want a bird to eat? It is as good as any! a merit, though a humble one. It breeds as freely, and with as little trouble; and there is nothing so neat and trim as it is among domestic birds, not even the most perfect of the Sebright Bantams. With its little round head and patting red feet, it is exactly a feathered Goody Two-shoes. And then, its performances in the air! beating all the *Cordes Volantes*, or Tight-rope Diavoli, into disgraceful inferiority. It is decidedly the most accomplished member of the aërial ballet. Pirouettes, capers, *tours de force*' and *pas d'agilité*, all come alike in turn. Other pigeons certainly can take any course in the air, from a straight line, that would satisfy Euclid as being the shortest distance between two points, to circles and ellipses, that remind us of the choreal orbits of the planets round the sun; but the Tumbler, while it is rapidly wheeling past some sharp corner in a tightly compressed parabola, seems occasionally to tie a knot in the air through mere fun; and in its descents from aloft, to weave some intricate braid, or whip-lash. This latter performance, I suspect, is quite a *leger-de-vol*, or sleight of wing; the bird does now and then tumble heels over head, and perform somersets, which the best clown at Astley's would be unwilling to risk at the same altitude above *terra firma*—for example, on the tip of a cathedral spire, or in the car of a balloon —but many of these intricate weavings are the result of some trick, best known to the performer, the real solution of which may be suspected to be the non-coincidence of the apparent centre of gravity of the bird with its real one. The Indian jugglers have a similar feat, in throwing a ball in a *spiral* course instead of in an acute parabola, more or less approaching to a vertical straight line; and the laws of motion would assure us that, with a *homogeneous* ball, such a feat is impossible, under the existing circumstances of the universe. But take a large *hollow* spherical shell, heavily loaded internally at *one* point of its circumference with lead, so that the centre of gravity of the mass is by no means in the centre of the hollow sphere, and a clever juggler, by a dexterous twist, will make it play strange freaks. Just so the wings and tail of the Tumbler are made to follow the impulse which themselves have given, and to revolve round the solid body of the bird, in seemingly the most unaccountable fashion.

"Our birds have all been shut up over night, so to-day let us have a morning performance, by special desire. Terpsichore, the saltatory Muse, belongs as much to air as to earth. House-tops, or better, tree-tops, shall be the boards of our rustic opera-stage; clouds shall be the wings; the blue sky, the flies; the rising sun shall do his best to fill the place of the gas in the foot-lights; the orchestra are selected from the *êlite* of Cocks and Hens, Ducks and Geese, with China Geese for the wind instruments and ophicleides, Thrushes and Larks for first fiddles, and the Cow and Pig for a pedal bass,—though the threshing-machine in the distance best represents *that*. The audience is composed of yourself, your wife, three or four boys and girls, the nursemaid with the little one, the woman who is hanging out the week's washing in the orchard, and the gardener who is come with a wheelbarrow to fetch some columbine guano for his melon-bed. This fresh breeze is better than the smell of orange-peel; that hedge of sweet-briar is more fragrant, though less powerful than a leaky gas-pipe. The word is given; *open sesame* falls the trap; the performers appear on their little platform, for all the world like the strolling actors in front of a show at a fair, cooing, bowing, advancing, retiring, in this their *divertissement.* They plunge into their air-bath like truant school-boys into a brook during the dog-days. The respectable aldermanic Pouter swells his portly paunch to the utmost, claps his wings smartly, and sails about in circles: it seems marvellous that *he* should be able to fly at all! But that darling little Cinnamon Tumbler, what a height it is! And now, seven times, I thought I counted, it went over; but whether it was over, or under, or roundabout, it would be difficult to say. Does your neck ache? Pray do not complain of it; greater folks than us, when the Hawk and the Heron were trying to over-reach each other, had to strain their eyes and necks a great deal more to enjoy the sport, and had a chance too of scratching out the one, or breaking the other, by riding into a bramble-bush or a pit—a danger we are not likely to incur on this pleasant grass-plot.

"Tumbling in the air, on the part of good unsophisticated Tumblers, is to themselves an act of pleasure. They never do it unless they are in good health and spirits: their best performances are after being let out from a short confinement. The young Tumbler, as soon as it has gained sufficient strength of wing, finds out by some chance that it *can* tumble; it is delighted at the discovery, and goes on practising, till at last it executes the revolution with satisfaction to itself—a feat the French have not performed of late years. Often and often the young Tumbler may be seen trying to get over, but cannot nicely; the same firmness of muscle and decision of mind are required to execute that *coup*, which empower the leading men at Astley's to throw their fortieth or fiftieth somerset backwards, and enable the *première danseuse* at the opera to drop from the air, and stand for a second or two in an impossible attitude on tiptoe. Beginners are incapable of such excellence."—*Pigeons*, by W. B. Tegetmeier. London: Routledge.

SOMETHING ABOUT JELLY-FISHES.

THE loiterer by the sea-side may have noticed in his rambles on the beach certain gelatinous substances left by the retreating tide. An interest excited by so strange a sight may have prompted a closer examination, and yet recognising nothing tangible or definite in the structure of these shapeless bodies, a desire has been really awakened to know something about them. We will try to satisfy this curiosity by giving a brief account of a few of our more common Jelly-fishes; for these shapeless lumps of jelly, seen stranded on our beaches, are really animals, assuming the most graceful and symmetrical forms in the water.

The Jelly-fishes, or Medusæ, have long excited the attention of naturalists from their singular structure, and the wonderful changes occurring during their growth.

While in the higher expressions of animal life the anatomist may puzzle over the intricacies of a complicated organization of the Jelly-fishes, he is at first more perplexed to find anything like organization in their parts, though they are really highly organized compared with animals still lower in the scale. So transparent are some, that one can hardly detect their presence in the water, and so largely does the sea-water enter into their composition, that certain kinds when dried lose ninety-nine one hundredths of their own weight.

Péron and Lesuer, two distinguished French naturalists, who, in the early part of this century made a voyage around the globe, thus summed up the results of their combined observations on these animals. "The substance of a Medusa is wholly resolved, by a kind of instantaneous fusion, into a fluid analogous to sea-water; and yet the most important functions of life are effected in bodies that seem to be nothing more, as it were, than coagulated water. The multiplication of these animals is prodigious, and we know nothing certain respecting their mode of generation. They may acquire dimensions of many feet in diameter, and weigh, occasionally, from fifty to sixty pounds; and their system of nutrition escapes us. They execute the most rapid and continued motions; and the details of their muscular system are unknown.

"Their secretions seem to be extremely abundant; but we perceive nothing satisfactory as to their origin. They have a kind of very active respiration; its real seat is a mystery. They seem extremely feeble, but fishes of large size are daily their prey. One would imagine their stomachs incapable of any kind of action on these latter animals: in a few moments they are digested. Many of them contain internally considerable quantities of air, but whether they imbibe it from the atmosphere, extract it from the ocean, or secrete it from within their bodies, we are equally ignorant. A great number of these Medusæ are phosphorescent, and glare amidst the gloom of night like globes of fire; yet the nature, the principle, and the agents of this wonderful property remain to be discovered. Some sting and inflame the hand that touches them; but the cause of this power is equally unknown."

Professor Richard Owen quotes these "lively paradoxes" to show the progress made since then in clearing up many points that were obscure at their time, and to show that even the skilful naturalist, with abundant material at hand, may plod on with uncertainty unless aided by the higher powers of the microscope. Recent works published by Professors Agassiz and Clark, and Mr. A. Agassiz, have detailed very fully the anatomy and classification of our native species.

The Jelly-fishes of our coast are represented by numerous globular and disk-like animals of gelatinous texture, more or less transparent, having certain appendages, consisting either of longitudinal bands of vibrating fringes, as in one order; or, as in another order, having appendages surrounding the mouth, and others, thread-like, hanging from the margin of the disk. The parts most conspicuous within the body are the ovaries, or egg-sacks, the stomach, and certain tubes running from the stomach to the periphery of the body.

These animals are apparently radiated in their structure; at all events, it is difficult in certain groups to distinguish a right and left side, and for this reason they are called Radiated animals, and form one of the three classes of the branch RADIATA.

The Jelly-fishes of our coast are common in our harbours and inlets, where the water is fresh and pure from the ocean. A very ready and convenient way to collect them is to moor your boat on the shady side of a wharf where the reflected rays of the sun are avoided, and, as the tide sweeps gently past, to dip them as they are borne along by the current. Some little practice is necessary to discern the smaller kinds, for many species are very minute, and other species, though of good size, are nevertheless hard to distinguish on account of their extreme transparency. They may be dipped from the water with a tin dipper, though a wide-mouthed glass jar is better for this purpose. As they are secured, they may be poured into a wooden pail for assortment and examination at home; or, better, a large glass jar, carried on purpose to hold them, may be filled at once, as too frequent changes destroy them.

Some species are very hardy, and may be kept alive for weeks, while others live only a few hours, gradually diminishing in size till they appear to melt away in the water.

Among the more common forms met with on our coast is the *Pleurobrachia*. Words fail in describing the beauty and singularity of this Jelly-fish. Conceive a globular body the size of a walnut or larger, but perfectly transparent, having eight bands of rapidly vibrating fringes surrounding the body, running from one pole to the other like the ridges on a walnut, and two thread-like appendages, festooned with hundreds of shorter threads, trailing out behind the body like the tail of a comet, and you have a general idea of this Jelly-fish.

The zones of vibrating fringes act like so many little oars, and impel the body through the water. At times, only the fringes on one side are in motion, and then the body rotates in the water like a vital globe. Anon, the different zones alternate in action, and the body describes a spiral course in the water. The most beautiful prismatic hues are exhibited when these fringes are in motion, and these brilliant changing colours often lead to their detection in the water. The long, thread-like appendages, already mentioned, are the most wonderful portion of the structure of this Jelly-fish. They are lined with hundreds of smaller threads, which start at right angles from the main threads, and are all of the extremest tenuity. The distance these appendages can be projected from the body, the instantaneous manner in which they are drawn within the body, and the perfect control the animal manifests in their movements seems incredible, until the movements have been actually witnessed. When contracted, these appendages occupy a space of exceeding minuteness, and when projected from the body seem to run out as a cable runs from a ship. We have sought in vain for any definite solution of the function of these threads, and are compelled to offer one derived from our own observations. Beside the locomotive power derived from the longitudinal zones of fringes, the body will be seen to oscillate to and fro, this motion being produced by the alternate contraction and relaxation of these threads, the resistance offered to the water by the sudden contraction of the expanded threads being sufficient to oscillate the body. The Jelly-fish in question, unlike most members of the class, swim with the mouth upward, and the appendages start from the pole opposite the mouth; and since the mouth is unprovided with any organs whereby to grasp food, the mouth has the power of sweeping back and forth in the water by the oscillations of the body, affording greater chances of coming in contact with their food. It has the power of seizing little shrimp-like animals, and a singular sight it is to see this Jelly-fish, with its repast perfectly visible within its transparent body.

There are two other forms of Jelly-fishes not uncommon in our waters, which have the zones of locomotive fringes, but have no trailing appendages, as in the species just described. One of these forms is called Bolina, and is somewhat larger than Pleurobrachia, being pear-shaped, and the larger end divided into two lobes which surround the mouth. These lobes have the power of expanding and contracting, and the contour of the animal is materially altered by their movements. They may sometimes be seen gaping wide, disclosing the mouth, and ready to entrap its food, and again so contracted that the mouth is quite hidden.

Another form called *Idyia* is long and cylindrical like a tube rounded and closed at one end, the other abrupt and open; the open end constitutes the mouth—in fact, it is hardly more than a locomotive stomach. This Jelly-fish has more consistency than those heretofore described, and is quite opaque. At certain seasons of the year they are pinkish in colour. An individual of this species, when confined with Pleurobrachia, soon manifests its carnivorous propensities by attacking, and often swallowing the Pleurobrachia whole. It does not appear daunted if its victim proves larger than itself, but slowly, patiently engulfs its victim; and a curious sight it is to see the Idyia directly after this feat is performed, presenting the appearance of a tight skin drawn around the innermost Jelly-fish, though in a short time its food is digested, and the Idyia resumes its normal shape, and not in the least augmented in size. It probably requires a dozen or more of such game for an ordinary lunch. This statement will not be wondered at, if the experiment is tried of drying a specimen of Pleurobrachia on a white card, and finding nothing left but a few crystals of salt. The vitality of these Jelly-fishes is remarkable; they can be cut in several pieces, and yet they will remain alive for a long time in the water; and one naturalist, after having cut an Idyia in half longitudinally, observed one half to enfold and digest another Jelly-fish.

The three forms thus far described are common representatives of an order of Jelly-fishes called *Ctenophoræ*, or Comb-bearers, the fringes or paddles having been compared by some writers to the teeth of a comb. These fringes form a distinguishing trait of the order. The members of this order are reproduced directly from eggs.

We will now consider another order of Jelly-fishes called *Discophoræ*, or disk-like Jelly-fishes, since the form of many creatures present a disk-like appearance. Members of this order are very conspicuous in the water, owing to their large size, their opacity, and the distinctness of their egg-pouches. They have no zones of locomotive fringes, but hanging below the disk and surrounding the mouth are numerous appendages, and surrounding the border of the disk is seen a delicate fringe of threads interrupted at regular intervals by little dots called eyes. These Jelly-fishes swim in the water by successive expansions and contractions of the disk, making a motion something like the motion made by the partial closing and opening of an umbrella. This motion is very leisurely performed, and the animal appears drifted by the currents and eddies with but little power to direct its course.

Our most common species, the *Aurelia*, occurs abundantly in our bays, sometimes in vast multitudes. When full-grown they measure from twelve to fifteen inches in diameter.

Another form, called *Cyanea*, often attains an immense size. Mr. A. Agassiz gives an account of one that measured seven feet across the disk, and whose appendages stretched out to the length of one hundred and twelve feet; their average size, however, is about one-third the dimensions just given.

The nettling sensation produced by certain Jelly-fishes, when brought in contact with the naked body, has long excited the attention of naturalists. The Cyanea is one of the most formidable in this respect, and Prof. Edward Forbes describes an English species as "the terror of tender-skinned bathers. With its broad, tawny, festooned, and scalloped disk, often a full foot or more across, it flaps its way through the yielding waters, and drags after it a long train of riband-like arms, and seemingly interminable tails, marking its course when the body is far away from us. Once tangled in its trailing 'hair,' the unfortunate, who has recklessly ventured across the graceful monster's path, too soon writhes in prickly torture. Every struggle but binds the poisonous threads more firmly round his body, and then there is no escape; for, when the winder of the fatal net finds his course impeded by the terrified human wrestling in its coils, he, seeking no combat with the mightier biped, casts loose his envenomed arms and swims away. The amputated weapons, severed from their parent body, vent vengeance on the cause of their destruction, and sting as fiercely as if their original proprietor itself gave the word of attack." Peculiar oval cells, each containing a little filament capable of protrusion, have been supposed to be the seat of this nettling sensation. These are called urticating cells, and the whole class of Jelly-fishes are called *Acalephs*, or Sea-nettles, from this peculiar property. These stinging cells cover the surface of the body and appendages, though, strange enough, there are many species possessing these cells that produce no stinging sensation whatever.

The strangest feature in the history of certain Jelly-fishes belonging to the order *Discophoræ*, as the Aurelia, for instance, is their wonderful mode of reproduction. It would require too long a time to detail the successive steps made before the whole truth was known regarding the development of these Jelly-fishes. How the successive stages were described by different zoologists as entirely distinct animals, until at last it was proved that they all represented the different stages of growth of one animal. The Aurelia, for example, gives origin to little locomotive eggs; these, swimming in shoals, finally effect lodgments on the rocks, one end becoming attached, and the other throwing out little tentacles. In this condition they resemble miniature Polyps. Gradually they increase in length, and little transverse seams, or constrictions, appear on the sides of the body, these constrictions deepening, and their edges becoming scalloped. Finally, the seams have deepened to such an extent that their appearance have been compared to a pile of saucers, and at last they become separated one after the other, each turning upside down, and swimming off free Jelly-fishes. In this stage they are called Ephyra, and are entirely unlike their parent in appearance. By the fall they will have obtained their adult form, and a diameter of twelve or more inches.

By far the greater number of our smaller Jelly-fishes belong to another order called *Hydroids*, and pass through phases of growth equally as strange as those above recounted. The limits of our paper will allow only a few words on this group. On the rocks at low water, and on floating weed, little moss-like tufts will be found in abundance. This plant-like growth, when examined under a lens, will be seen active with life. The ends of the little twigs and offshoots appear as little bell-shaped cups, with tentacles studding the free ends like the plates of a flower; these are the fixed individuals, and are the purveyors of the community. In the spring-time little capsules will be noticed on the twigs, within which are to be seen minute globular bodies, to be finally set free by the rupture of the capsule, as free swimming Jelly-fishes. Others bud directly from the twig and drop off singly, as in *Coryne*. These are found by thousands in spring time. Not only do these free Jelly-fishes bud from fixed communities, but in one species young ones bud from the Jelly-fish itself, as in *Lizzia*, and certain others where the young bud from the stomach. All these Hydroid Jelly-fishes produce eggs, which again give rise to plant-like communities.—Edward S. Morse, in the *American Naturalist* for July.

THE DOUBLE COCOA-NUT.

FIFTY-FIVE years ago, on visiting the museum of the College at St. Andrew's, in Fifeshire, amongst other curiosities the keeper took down from a shelf a black lumpy body about a foot in length, and nearly as much in width, and holding it in both hands told me it was a "Pomegranate." I had read of Pomegranates in the Bible when at school, and in dread of the awful words "take him down," had learned to spell the word correctly; but I then had no idea a Pomegranate was like the hulls of two toy boats fastened together by their gunwales, such being the idea to which I compared the object before me. It was not for a number of years after this that I saw or learned anything more about Pomegranates, but on gaining a knowledge of botany I became sceptical of the St. Andrew's Pomegranate being the same as those spoken of in the Bible; and I at length found it was the Double Cocoa-nut.

The principal facts relating to the structure and appearance of this singular palm have frequently been given in your columns, where also the peculiar perforated bowl or socket in which the base of the trunk is immersed has been more than once figured and described. The following observations relating to the mode of germination of the seed may serve in a measure to explain the formation of this bowl.

In a few weeks after a fresh nut is placed in a tan bed, or other warm open material, a white body about the thickness of the finger is seen protruding from between the lobes of the nut, which quickly elongates downwards in a nearly perpendicular direction (in its native country it is said at an angle of 45°), attaining the length of about 2 feet, the end thickening and becoming fusiform. This part contains the true embryo, and may be considered the placenta, and on its bursting on one side, the growth of the embryo commences by the protrusion of the first leaf, which is succeeded by others; roots are at the same time produced. During this process of growth the nut continues to supply nutriment to the young plant through the long cord or funiculus as it may be called, and which it continues to do for several years, the plant gradually increasing in size, and the roots in number and strength, so as ultimately to become sufficient for its support: the funiculus gradually drying up, but not so the point to which the embryo is attached. All Palms germinate in the same manner as above stated, the embryo retaining its connection with the end of the funiculus, which becomes a progressing axis of development of leaves and roots, creeping on the surface of the ground, or burrowing downwards at a more or less acute angle, and becoming analogous to a rhizome. This it continues to do until the plant attains its majority (which is often not before many years), that is, when it has matured its ascending axis, the rhizome remaining in the form of a spur-like stump, even after the plants have attained many years of age. This rhizome structure may assist in explaining the manner of the formation of the socket of the Lodoicea. When I had the opportunity of observing the germination of the nuts, I was not then aware of the bowl appendage, therefore my attention was not directed to that special point, and consequently I cannot speak from direct observation as to how it originates. Seeing that the embryo of Palms continues its connection with the placenta, it would seem that in the case of the Lodoicea the connection of the embryo continues in the lower cavity of the placenta, in which it continues to grow, and through which it receives nutriment, until the seed nut is exhausted, during which time roots have been doing their duty—and the connection of the sac still being continued, it would appear that a reflow of sap from the plant into the sac takes place, which grows with the growth of the plant, and becomes penetrated with the stiff cord-like roots; and thus the holes and tubes are found. Therefore this socket may be viewed as of the same nature of growth as the rhizome of other Palms, differing only in the original growth of the plant being central instead of lateral, and retaining its attachment through life. In the large bowl at Kew the point of attachment is indicated by a few inches of rough surface in the centre at the bottom, and destitute of holes. There is much, however, yet to be learned on this subject, and which can only be obtained by examining plants at different stages of their early growth.

During the last 50 years many nuts of this Palm have come to this country, eight of which germinated at Kew under my own observation, but a want of knowledge of the early nature of the plant, and the circumstances detailed above, must be admitted as an excuse for our not having succeeded in establishing a plant of Lodoicea. This is in a great measure due to the period they take to pass through what may be called their infant state (which may be considered not less than 10 years), and to the want of proper arrangements to keep them in one position, as well as to the fluctuations of heat and moisture during that time. It is impossible, even under the most favourable circumstances, to say what number of years will be required before an ascending trunk can be formed, but certainly it cannot be less than 50.

A plant established in the Mauritius Garden, known to be 30 years old, has still the appearance of a young plant, having numerous healthy leaves rising from the ground, but none of them exceeding 5 feet in height. About 16 years ago a plant growing in a small barrel was sent from the Mauritius, the largest leaf being from 5 to 6 feet in length, but unexpanded. In this state it was forwarded to Kew, but unfortunately it had no protection during the voyage to England, the leaf not even being supported, so that it was twisted with every breeze, and on its arrival the centre of the plant was found to be completely destroyed. A nice plant, properly secured in a large case, was also sent by Mr. Duncan, the late Director of the Mauritius Botanic Garden, but the long voyage proved fatal to it. Had it not been for these untoward events, Kew might by this time have been possessed of Double Cocoa-nut plants. The only plant of it known to me in this country is one lately sprouted in the Botanic Garden, Liverpool, under the skilful management of Mr. Tyerman; and, the nature of the plant being better known, success may now be expected.—J. Smith, Ex-Curator, Royal Botanic Gardens, Kew, in *Gardener's Chronicle*, July 27th.

SNAKES.

It was, I think, in the summer of 1827 that I first began to collect snakes. I was then stationed with my regiment at Bareilly, and not far from my bungalow was a small *jhil*, or swamp, along the margin of which, defying malarious influences and a burning sun, I have passed hour after hour, continually eyeing every inch of ground in search of the numerous snakes that harboured there. My tackle consisted of a large jar filled with spirits of wine, into which the smaller species were plunged as soon as caught; a good-sized basket, to the top of which was fastened a linen bag without a bottom and the mouth secured by a string, for the larger kind. In my hand I carried a long, thin rod, to the end of which was attached a strong noose or slip-knot. When a snake was discovered basking in the sun, I cautiously and silently approached, until near enough to pass the noose gently over the head, when with a sudden jerk it tightened round the reptile's neck, and from the immediate expansion of the jaws was prevented from slipping off again. A little practice at this kind of fishing soon made me so expert, that I seldom missed the exact spot behind the head, but if this occurred, the reptile would manage to wriggle through the loop and escape among the weeds of the swamp. Once properly secured, however, it would throw its tail over the end of the rod and coil up in a knot, so as to be easily conveyed either into the jar or into the basket. In this manner, at the end of about two years, I had made a very extensive collection, which was afterwards extended to about 200 bottles of beautifully preserved reptiles of different kinds, by the purchase of a large number of specimens from a friend who had once amused himself in a similar manner.

This fine collection was unfortunately destroyed during a long illness, which compelled me to repair to Calcutta, and finally to Europe. On my return to India I found my regiment stationed in Western India, among the Bheels. Here I first fell in with the python, or rock snake, but for a long time I could obtain a sight of none longer than from 6 to 9 feet, while my ambition was to procure one from 25 to 30 feet in length. Time flew on, and I began to think my wishes in this respect would never be gratified, when I unexpectedly fell in with a python under somewhat awkward circumstances. I had gone out among my friends the Bheels for a few days' shooting, coursing, and butterfly-collecting, and had one morning passed several hours much to my satisfaction, when I began to think it high time to recruit exhausted nature by diving among the contents of a large basket of provisions provided for the occasion. A convenient spot was soon found near the foot of some low hills, where there was a small grove of mango-trees, and near them, growing out of the crevices of some enormous outlying masses of green-stone, were two or three large bur or burgut trees (*Ficus indica*), covered with fruit, among which a troop of monkeys (*Inuus rhesus*) were committing tremendous havoc. Selecting the nearest burgut as affording ample shade, the monkeys beat a speedy retreat to the clump of mango-trees hard by, at the edge of which was a narrow strip of tolerably high jungle grass. The tree I had selected sprang up from the crevices of a rock at its base, and here I sat me down, without observing a hole which, passing under the side of the rock, was, as we afterwards found, continued into the hollow trunk of the old burgut from beneath.

There was a space, perhaps of two feet between my back and the rock, and fortunate for me that it was so. My Bheel friends and I had nearly discussed the contents of my provision basket, a task in which they are always ready to assist, when I was startled by feeling something rubbing against my back ; and on cautiously looking round, I beheld to my horror the object of my lengthened search, gliding along from the before-mentioned hole between my back and the rock. At the first glance, I candidly confess my blood ran cold from crown to heel, and the impulse was to make a sudden bolt of it, the very worst thing I could have been guilty of ; in the next moment my knowledge of the reptile's habits, and a glance at my Bheel guides who were sitting opposite to me, and who on perceiving my consternation had turned their attention to the spot, at once convinced me my only chance of safety lay in remaining stock-still until the reptile had passed on. The eyes of my savage guides were literally starting from their sockets, while at the same time each kept a finger pressed upon his lips enjoining silence and immobility. In a few moments the snake had passed on towards the narrow grassy belt that intervened between the margin of the mango clump and my position ; and as soon as his head was fairly concealed by the grass, the Bheels both darted off to an open field ; and I, picking up my gun, which perhaps luckily for me had been unloaded, followed their example, and prepared for action. I had loaded one barrel, and was in the act of giving the last home-thrust to the ball in the other, when our ears were suddenly assailed by the most discordant squeaks and screams from the monkeys in the mango clump, the whole troop being in frantic motion and agitated by the greatest alarm, all stretching forward their heads to one particular spot, which said as plainly as words could have done, "There he is." Hastening to the spot where the python had disappeared, I cautiously peered through the long grass to get a sight of him, not knowing whether the clamour was occasioned by his having seized a monkey, or whether he was merely waiting for his prey. We soon perceived him, however, lying at the foot of a large tree, round the lower trunk of which his tail was partially coiled, while the rest of his body (which must have measured between 14 and 15 feet) was coiled, fold upon fold, around the yet convulsively-quivering body of a fine old monkey.

Seeing all was now safe, I called to my syce to bring the horse blankets and halter ; the former was quickly spread upon the ground beside the snake, while the syce and I with some difficulty succeeded in removing the coil of the tail from the tree, and then rolled over the snake and his prey together into the blanket, which was speedily folded round them, tying the corners together and making all secure with the halter. I then started off the Bheels to a neighbouring village for some men, a large basket, and some more ropes, hoping almost against hope that they would return before the python relaxed his hold, which I knew well he would not do while a muscle quivered or an atom of life remained in the monkey. The Bheels returned more speedily than I had anticipated, and having procured a large open basket or tokree, the snake in the bundle was rolled into it and the whole well tied up and made secure, as we thought, with the extra ropes. A pole being tied across the basket, five or six men placed the load upon their shoulders and at once started at a jog-trot towards my tent, which was pitched at about half a mile from us. As soon as they were fairly off, I mounted my horse and galloped off to make what preparations I could for the reception of my long-coveted prize ; and having cleared out a beer-chest as his temporary abode, I walked to meet my sable companions. I had not gone far, however, when I saw two men tearing over the ground towards me as if for their very lives, jabbering and gesticulating all the while in a most frantic manner ; and it soon appeared that the python, on uncoiling from his dead prey, had contrived to push his head out of the blanket and the basket too, which the Bheels behind no sooner perceived than they summarily dropped the basket, and ran back to their village at the top of their speed. Thinking it quite possible, however, that the snake might have pushed his small head out of the blanket without being able to extricate his thick body, I walked on to the spot where the Bheels had dropped him; here we had to proceed with caution, until the trail of the body across the soft earth of a recently ploughed field showed that the monster had actually effected his escape into the long, coarse jungle-grass into which it was not safe to follow him, and although I offered fifty rupees to anyone who would recapture him, I never saw my friend again, and doubt much if the Bheels ever ventured a second time into such an uncanny neighbourhood. Some years after this when I repaired, with a shattered constitution to Mussooree in the Himalaya, after the Afghan campaign, I at length procured a python measuring 18 feet 9 inches in length. It was a magnificent reptile in appearance, but unfortunately had a disease in the gums which is not uncommon with these snakes, and which prevents them from seizing their prey. For six months my specimen ate nothing, and then, being no doubt desperately hungry, it contrived to dispose of a hare. After this, for seven months more it refused to feed, although perfectly active and vigorous. The winter setting in at this time, the reptile in its famished state had no strength to bear up against the cold, and died after having lived more than thirteen months upon a single hare. During the time I possessed this snake it twice escaped from its cage; once, however, it had evidently been let out by a native who had a grudge against me, and as a punishment, when we proceeded to search for the animal I made this man head the column, which he did in dire dismay, as every one assured him the snake would seize and swallow him. At last however, I took the lead myself, and soon discovered the snake basking in the morning sun among some ferns. Ropes and blanket were then brought forward, and a nooze having been cast over his head, and drawn tight, the most desperate struggle began, the animal's streng thactually dragging more than a dozen men after it, until we contrived to bring the end of the rope round the trunk of a tree, which at last brought the monster to a standstill. It then darted furiously at anyone who attemped to pass other ropes around it, and we could do nothing with it until a net was brought and dexterously cast over it, in which it soon entangled itself to such a degree as to become harmless, when we tightened the ropes and, rolling the snake into a stable blanket, carried him with some difficulty to his cage. This species, known as the *Python molurus* of Linnæus, is exceedingly numerous in the Dehra Doon, below Mussooree on the south, but the large ones are not often procurable. Of the smaller individuals, from 6 to 10 feet in length, I have sometimes been offered as many as twenty in the course of a week. The people who catch them are evidently gipseys, living apart as they do elsewhere: after showing these snakes for the purpose of gain, they cook and eat them, as indeed they do most other wild animals. In their hunting expeditions they employ both nets and dogs trained for the purpose; the latter hunt about silently in the tall grass and bamboo jungles skirting the rocky Siwalik range on the south of the Doon, and only "give tongue" when a snake is discovered. The men then advance and secure the reptile in their nets and blankets. The winter is the best hunting season, as the snakes are then found "*chez eux*" under rocks, in tufts of grass or bamboos, etc., while in the rainy summer they are wandering far and wide.—T. H., *Land and Water*, Aug. 10th.

MADREPORES.

THERE are various classes and species of madrepores, but they all possess the same nature, being, as is generally believed, fossilised marine animals, or rather the *fossilised work* of marine animals. The number of years which have elapsed since the skilful artisans performed their work, is uncertain; in all probability it was before the time when "Adam delved and Eve span;" but upon this subject I have neither space nor inclination to enter; it is sufficient for my purpose to say that the marine architects were once endowed with life and breath, and that their work is now literally, as the saying is, "turned into stone."

When in the rough state, madrepores might frequently be passed by unnoticed, and even if picked up, they would possess but few attractions in the eyes of casual observers, and a most valuable specimen might be thrown away; but once let the fossil be cut and polished, its wonders and beauties are then fully displayed, and could scarcely fail to be appreciated, to some extent, even by those who consider themselves, as "Punch" says, "Much above that sort of thing." As I have already mentioned, there are many kinds of madrepores: each class is divided and sub-divided; consequently the varieties are almost innumerable; but those most generally known and sought after are "feathers," "suns," "stars," "sponges," "birds'-eyes," "pin-points," and "honeycombs."

Madrepore-hunting, like most other pursuits and employments, has its drawbacks as well as its delights; very frequently does the collector return home wearied, and perhaps dispirited from a search of many hours, during which time he has found scarcely anything to reward him for his trouble ; but patience and perseverance are invaluable companions, and in due course of time may carry all before them.

I believe madrepores are to be found in many parts of the world. I have found them in comparative abundance on the south Devonshire coast ; in the "Bradley Woods," situated about eight or nine miles from Teignmouth, there are very extensive quarries of "feather" and "star" madrepore ; so manifold are the specimens there displayed, that it is a puzzling matter to decide which to keep and which to throw away, each quarry having its own peculiar sort. The collector feels at first quite bewildered by the mine of valuable pieces around him ; his pockets are quickly filled, and as quickly emptied, as fresh wonders meet his view, and at length, finding it totally impossible to keep all, he is obliged to select a few of the best, and to turn his back resolutely on all others.

The "birds'-eye" and "sponge" madrepores are some of the most common kinds ; the "honey-comb" and "pin-point" are considered more valuable, and good specimens are much prized by the collector.

Madrepores are shown to great advantage when set in silver or gold, and made into brooches, bracelets, pins, and other ornaments of a similar nature ; the art of cutting and polishing these fossils is easily acquired, although lapidaries may say otherwise, and endeavour to impress upon you that it is a very intricate and mysterious business. But of course this is only natural, as, were the secret generally known and applied to a practical use, many an honest, hard-working man would be at a loss to earn his livelihood.

Live madrepores are occasionally dredged up at sea on our own shores. In Rees' Cyclopædia it is stated that "there are about 120 species scattered through the different seas on our globe, some of which are common to our coasts," and that they are "a genus of the class vermes, and order zoophyta—animals resembling a medusa ; coral with lamellate star-shaped cavities ;" and a little further on, the description of the live madrepore is continued thus :

"In speaking of the animal that fills the cavities of the madrepore, it is said, its feet are numerous, and terminate externally in two conical productions, which, being placed on each side of every one of the lamellæ that give the stellular form to the cavity of the coral, serve to affix the animal to the circumference of its cell, and may with propriety be considered as the instruments by which the little animal forms the lamellæ themselves. . . . . . Admitting that the formation of these corals is the work of the madrepore polype, it may be thus traced through its wonderful labours. It is found that each of the legs of the polype is provided with two processes, which are applied to each side of one of the perpendicular laminæ, while a muscular pyriform body, attached to the other end of the leg, gives to it the power of employing that motion which is necessary for the accomplishment of its task. The young polype may be considered as completing its operation by two distinct processes : the secretion and separation of carbonate of lime from sea-water conveyed through the pyriform body ; and its disposition, at the moment of secretion, by the two small processes, where the economy of the animal directs. Proportioned to the number of legs possessed by the infant animal, is probably the number of perpendicular laminæ, or pillars, converging in the centre, which it begins to erect ; these, when raised to a certain height, appear to be connected together by a horizontal plate of the same substance ; on these the animal erects similar pillars, and places on them a covering similar to that with which he has completed the first compartment.

"Thus seem to proceed the labours of this minute artist ; and as the number of its legs or instruments increase, and as they extend in length, so much the number of the perpendicular laminæ and the circumference of the horizontal plates, augment."—*Once a Week*, Aug. 10.

RATS.

THE rat is omnipresent : it is as well known in every quarter of the globe as the common house-fly ; wherever food is, there it is certainly to be found. That it performs some useful purpose in the world's economy cannot be doubted—it clears away refuse that would other otherwise create a nuisance ; but it is also certain that it destroys a great deal of food, and spoils more. For this reason it has no friends, and it is most remorselessly hunted to death wherever it is to be found. At Bankok, the capital of Siam, they keep rats in the house, thoroughly tame, which act as cats, keeping at a distance any of its kind that may venture to intrude. These tame rats are pretty nearly as big as young cats, and they are so domesticated, that they climb up their masters' knees and are petted, just as though they were some favourite dog. In Germany they sometimes tame a rat, and hang a bell about its neck, a plan that effectively drives away all other rats on the premises, which naturally feel astonished at such a strange ornament upon one of their own kind. By no means should it ever be attempted to get rid of rats by poison, for they creep away to die in the walls or behind wainscotting, and the consequence is that an intolerable smell is the consequence; or they will try to quench their thirst by drinking water or milk, into which, in their agony, they vomit, and the consequence is that they leave the poison behind them, to the destruction of other creatures that come and drink after them.

The ratcatcher is the most effective instrument of extermination when once they have had a lodgment in any house. But prevention is better than cure. Wherever large stores of food are kept it is necessary to place them in a state of defence against this persevering enemy, which is ever on the watch to find an entrance; for, one only fairly in, all the rats of London, or the neighbourhood at least, by some mysterious freemasonry known to rat nature, are speedily informed of the fact, and make for the promised land. The bonded wheat warehouses on the Thames are plated inside the floors with sheet iron; even the doors are covered with a like armour, and the foundations are solidly concreted and filled with pounded glass, for nothing less solid and unpleasant will stay the invading army that is for ever on the watch to sap and mine into the fortress. We have said that the Zoological Gardens is a pleasant land for rats. The quantity of food always on the floors of the animals' dens is a temptation they cannot resist. Rats and mice may be seen any day quietly feeding in the dens of the larger carnivora. The gorged lion lifts up its sleepy eye, but is far too magnanimous to interfere with the tiny partaker of its meal. Who knows? it may fancy, like its brother in the toils, that it is not too little to do it a good turn yet. But night time is the field day, if I may so speak, for the rats. They swim across the canal, and reign here supreme, and in the darkness there are a very much larger number of animals in the gardens than the Society know anything about.

The fecundity of rats is extraordinary; they begin to litter as early as six months old, and they go on for some time having four litters a year, the average number of each litter being eight. A little calculation will show that in a very few years where food is plentiful, and no destructive agency is at work, they would increase to millions; hence we see the necessity for the preventive check, in the shape of the hunting instinct which, from man downward, marks the rat for its prey. But, when driven hard, the little fellow can make a good fight for it, and give as good as it gets. Mr. Jesse tells a tale of a fight between a ferret and a rat, which proves that he can reason and manœuvre for the best fighting ground as well as any general. A gentleman, he tells us, on one occasion turned a ferret and a good-sized rat into an empty room with but one window. "Immediately upon being liberated the rat ran around the room as if searching for an exit. Not finding any means of escape he uttered a piercing shriek, and with the most prompt decision took up his station directly under the light, thus gaining over his adversary (to use the language of the duellist) the advantage of the sun. The ferret now erected its head, sniffed about, and began fearlessly to push its way towards the spot where the scent of the game was the strongest, facing the light in full front, and preparing itself with avidity to seize its prey; no sooner, however, had it approached within two feet of the watchful enemy, than the rat, again uttering a loud cry, rushed at the ferret with violence, and inflicted a severe wound upon the head and neck, which was soon shown by the blood which flowed from it. The ferret seemed astonished at the attack, and retreated with evident discomfiture, while the rat, instead of following up the advantage it had gained, instantly withdrew to its former station under the window. The ferret soon recovered the shock it had sustained, and erecting its head one more took the field. This second rencontre was in all its progress and results an exact repetition of the former—with the exception that in the rush of the rat to the conflict, the ferret appeared to be more collected, and evidently showed an inclination to get a firm hold of its enemy; the strength of the rat, however, was very great, and it again succeeded, not only in avoiding the deadly embrace of the ferret, but also in inflicting another severe wound upon its head and neck." For two hours the attack and defence went on evidently to the advantage of the rat, when the gentleman determined to see what would be the result of turning the latter from its vantage-ground. The consequence was that the rat lost confidence, which the ferret gained, and the latter speedily mastered it, not without being bitten to shreds in the encounter, over the head and muzzle. The conduct of the rat, we are told, was the same in a second encounter, in which it was victorious. This proves that under favourable circumstances it is more than a match for its ancient enemy.

We have said that in France the fur and the skin of this animal are utilised. We are told that if our prejudices were not so great, its flesh might also be used as food. The grain-fed rat is anything but coarse food, and when soldiers and sailors have been in straits for food, rats have been eaten with a relish. We are afraid, however, even if we were to suggest to poor Hodge that he may now and then make a pie out of the varmint in the wheat-rick, he would reply, "Well, maister, suppose thee try it thyself."—*Cassell's Magazine* for August.

LOCUSTS.

THERE is an article of food which is used by the natives, in its proper season, and does not prepossess a European in its favour. This is the locust, the well-known insect which sweeps in such countless myriads over the land, and which does such harm to the crops and to everything that grows.

The eggs of the locust are laid in the ground, and at the proper season the young make their appearance. They are then very small, but they grow with great rapidity—as, indeed, they ought to do, considering the amount of food which they consume.

Until they have passed a considerable time in the world, they have no wings, and can only crawl and hop. The Kaffirs call these imperfect locusts "boyane," and the Dutch settlers term them "voet-gangers," or "foot-goers," because they cannot fly. Even in this stage they are terribly destructive, and march steadily onwards, consuming every green thing that they can eat.

Nothing stops them in their progress short of death, and, on account of their vast myriads, the numbers that can be killed form but an insignificant proportion of the whole army. A stream of these insects, a mile or more in width, will pass over a country, and scarcely anything short of a river will stop them. Trenches are soon filled up with their bodies, and those in the rear march over the carcases of their dead comrades. Sometimes the trenches have been filled with fire, but to no purpose, as the fire is soon put out by the locusts that come crowding upon it. As for walls, the insects care nothing for them, but surmount them, and even the very houses, without suffering a check.

When they become perfect insects and gain their wings, they proceed, as before, in vast myriads; but this time, they direct their course through the air, and not merely on land, so that not even the broadest river can stop them. They generally start as soon as the sun has dispelled the dews and warmed the air, which, in its nightly chill, paralyses them, and renders them incapable of flight and almost unable even to walk. Towards evening they always descend, and perhaps in the daytime also; and wherever they alight, every green thing vanishes. The sound of their jaws cutting down the leaves and eating them can be heard at a great distance. They eat everything of a vegetable nature. Mr. Moffatt saw a whole field of maize consumed in two hours, and has seen them eat linen, flannel, and even tobacco. When they rise for another flight, the spot which they have left is as bare as if it were desert land, and not a vestige of any kind of verdure is to be seen upon it.

A very excellent description of a flight of locusts is given by Mr. Cole, in his work on South Africa:—

"Next day was warm enough, but the wind was desperately high, and, much to my disgust, right in my face as I rode away on my journey. After travelling some ten miles, having swallowed several ounces of sand meanwhile, and been compelled occasionally to remove the sand-hills that were collecting in my eyes, I began to fall in with some locusts. At first they came on gradually and in small quantities, speckling the earth here and there, and voraciously devouring the herbage.

"They were not altogether pleasant, as they are weak on the wing, and quite at the mercy of the wind, which uncivilly dashed many a one into my face with a force that made my cheeks tingle. By degrees they grew thicker and more frequent. My progress was now most unpleasant, for they flew into my face every instant. Flung against me and my horse by the breeze, they clung to us with the tightness of desperation, till we were literally speckled with locusts. Each moment the clouds of them became denser, till at length—I am guilty of no exaggeration in saying—they were as thick in the air as the flakes of snow during a heavy fall of it; they covered the grass and the road, so that at every step my horse crushed dozens; they were whirled into my eyes and those of my poor nag, till at last the latter refused to face them, and turned tail in spite of whip and spur. They crawled about my face and neck, got down my shirt collar and up my sleeves—in a word, they drove me to despair as completely as they drove my horse to stubbornness, and I was obliged to ride back a mile or two, and claim shelter from them at a house I had passed on my route; fully convinced that a shower of locusts is more unbearable than hail, rain, snow, and sleet combined.

"I found the poor farmer in despair at the dreadful visitation which had come upon him—and well he might be so. To-day he had standing crops, a garden, and wide pasture lands in full verdure; the next day the earth was as bare all round as a macadamised road.

"I afterwards saw millions of these insects driven by the wind into the sea at Algoa Bay, and washed on shore again in such heaps, that the prisoners and coolies in the town were busily employed for a day or two in burying the bodies, to prevent the evil consequence that would arise from the putrefying of them close to the town. No description of these little plagues, or of the destruction they cause, can well be an exaggeration. Fortunately, their visitations are not frequent, as I only remember three during my five years' residence in South Africa. Huge fires are sometimes lighted round corn-lands and gardens to prevent their approach; and this is an effective preventive when they can steer their own course; but when carried away by such a wind as I have described, they can only go where it drives them, and all the bonfires in the world would be useless to stay their progress. The farmer thus eaten out of house and home (most literally) has nothing to do but to move his stock forthwith to some other spot which has escaped them—happy if he can find a route free from their devastation, so that his herds and flocks may not perish by the way."

Fortunately, their bodies being heavy in proportion to their wings, they cannot fly against the wind, and it often happens that, as in the old Scripture narrative, a country is relieved by a change of wind, which drives the insects into the sea, where they are drowned; and, as Mr. Cole observes, they were driven by the wind into his face or upon his clothes, as helplessly as the cockchafers on a windy summer evening.

Still, terrible as are the locusts, they have their uses. In the first place, they afford food to innumerable animals. As they fly, large flocks of birds wait on them, sweep among them and devour them on the wing. While they are on the ground, whether in their winged or imperfect state, they are eaten by various animals; even the lion and other formidable carnivora not disdaining so easily-gained a repast. As the cool air of the night renders the locusts incapable of moving, they can be captured without difficulty.

Even to mankind the locusts are serviceable, being a favourite article of food. It is true that these insects devour whole crops, but it may be doubted whether they do not confer a benefit on the dusky cultivators rather than inflict an injury.

As soon as the shades of evening render the locusts helpless, the natives turn out in a body, with sacks, skins, and everything that can hold the expected prey, those who possess such animals bringing pack oxen in order to bear the loads home. The locusts are swept by millions into the sacks, without any particular exertion on the part of the natives, though not without some danger, as venomous serpents are apt to come for the purpose of feeding on the insects, and are sometimes roughly handled in the darkness.

When the locusts have been brought home, they put them into a large covered pot, such as has already been described, and a little water added to them. The fire is then lighted under the pot, and the locusts are then boiled, or rather steamed, until they are sufficiently cooked. They are then taken out of the pot, and spread out in the sunbeams until they are quite dry; and when this part of the process is completed, they are shaken about in the wind until the legs and wings fall off, and are carried away just as the chaff is carried away by the breeze when corn is winnowed. When they are perfectly dry they are stored away in baskets, or placed in the granaries just as if they were corn.

Sometimes the natives eat them whole, just as we eat shrimps, and, if they can afford such a luxury, add a little salt to them. Usually, however, the locusts are treated much in the same manner as corn or maize. They are ground to powder by the mill until they are reduced to meal, which is then mixed with water, so as to form a kind of porridge. A good locust season is always acceptable to the natives, who can indulge their enormous appetites to an almost unlimited extent, and in consequence become quite fat in comparison with their ordinary appearance. So valuable, indeed, are the locusts, that if a native conjurer can make his companions believe that his incantations have brought the locusts, he is sure to be richly rewarded by them.—*Routledge's Natural History of Man.*

VOLCANOES ON THE MOON.

Assuming the probable, or, at least, the possible, existence of active volcanoes upon the moon, it remains to be seen how the operation of such volcanoes is to be detected from our earth. The colours seen in different parts of the moon's surface are little marked, and grey or neutral-tinted regions are so prevalent that it would be very difficult to note the change of colour, produced by the downfall over large tracts, of matter ejected from erupting volcanoes. Differences of elevation produced by such downfalls afford a much more favourable object of examination. We proceed to show how lunar elevations and depressions are detected. Those of our readers who have watched the phenomenon of sunrise from the summit of a lofty mountain, will have noticed that when the summit of the mountain is in the full glory of the rising sun, the sides of the mountain are still in shadow, and that the neighbouring valleys are plunged in a yet deeper gloom. Corresponding appearances are seen when the sun is setting. Long before the mountain-tops are darkened, the level country around is shadowed over, and the obscurity of night has already settled on ravines and passes. Now, the only respect in which sunrise or sunset on a lunar mountain differs from the corresponding phenomenon on earth, lies in the fact that, owing to the want of an atmosphere, there are no half-lights—nothing but the full blaze of light reflected from parts actually shone upon by the sun, and intense blackness where his rays have not yet penetrated. The black shadows around a lunar mountain are readily seen, and a careful examination of their figure and changes of figure suffices to indicate the shape of the mountain. The approach of sunrise or sunset in the neighbourhood of the larger lunar mountains is an interesting phenomenon, which may be observed with instruments of very moderate power. But slight changes of elevation produced by volcanic agency, to be detected at all (even if observation has been directed to a particular spot), require a powerful telescope, and (which is often forgotten by the inexperienced) skill and practice in the use of the instrument. And although sunrise and sunset are slower processes in the moon than with us (the lunar day being equal in length to our lunar month), yet the time in which it is possible to observe the shadows around small mountains is short; and as favourable opportunities for observation recur only once, or at the most twice, in every lunar month (and bad weather may interfere with observation), the satisfactory observation of delicate features of the moon's surface is a work of time and labour. To detect *changes*, it is necessary, of course, that the moon should be carefully mapped. This has been done by many observers—by Cassini, Riccioli, Schröter, Lohrman, Beer, and Mädler, and others. Photography, at first necessarily limited to minute pictures, but now applied, under the able hands of Delarue, Rutherford, and others, to produce pictures two or three feet in diameter, will one day render effective service in the work we are describing. For a long time, however, the map of the moon now being prepared under the auspices of the British Association, will doubtless be the most complete and satisfactory work of reference. This will largely surpass all other maps in fulness of detail, and also, we may feel certain, in accuracy. But to show that previous labours had been conducted with energy and patience, it is sufficient to note that the elevations of a thousand and ninety-five lunar mountains had been determined, and that in Beer and Mädler's map the positions of no less than twenty thousand craters have been recorded.—*Temple Bar*, August.

PANICUM SPECTABILE AND SORGHUM.

Dr. Lindley says that the Panicum spectabile grows in Brazil to a height of 6 or 7 feet, "while other equally gigantic species constitute the field crops on the banks of the Amazon." The genus Penicillaria has a wide geographical distribution in tropical countries. P. spicata, Willd., is a very important food plant on the Niger and Gambia rivers, it is in daily household use, and most of the beer of the country is prepared from it. The seeds are said to be even more nutritious than Rice. The fruiting spikes are very close and compact, and average from 18 inches to 2 feet in height; for travelling, a number of these ears are fastened together by their stalks, the ends of the stalks being placed opposite to each other, so as to bring the two opposite spikes parellel, the whole is then readily rolled up and conveyed on the backs of oxen to market. The several species of Sorghum belonging to the tribe Andropogonæ, are perhaps more important than any other Millet-yeilding species. The Sorghums are very imperfectly understood in a botanical sense; those known as S. vulgare, Pers., and S. saccharatum, Mœnch, are the most valuable. These are, however, thought by some authorities to be varieties only of Sorghum halepense, Pers., which grows abundantly in a wild state in the south of Europe, North Africa, &c. The inflorescence of the Sorghums is in large dense panicles; a single fruiting panicle of Sorghum vulgare when ripe frequently weighs 6 or more ounces. The panicle denuded of its seeds make excellent brooms. There are several varieties of this species, the panicles of which are either black, white, reddish, or yellow. This plant has long been cultivated in the south of Europe, Egypt, India, &c.; in Africa it is known as Dawa Corn. Sorghum saccharatum, Mœnch, has lately been brought into notice as a sugar-yeilding Grass. It seems to have been grown in Tuscany, and sugar made from it so far back as the latter part of the last century. Little, however, was known of it in Europe till the French consul at Shanghai sent some of the seeds to Paris in 1851, labelled "Sugar Cane of North of China." This plant is now largely grown in all quarters of the globe, extending from France to Algeria, Russia, N. America, the East Indies, and Australia. The seeds are much used for soups, puddings, &c. Numerous treatises have been written on the plant, chiefly in France in connection with its sugar-producing qualities. This, as well as S. vulgare, and indeed nearly all the species of Sorghum, appear useful as fodder plants. Cattle and horses are said to be fond of the stems and leaves. There are a whole host of varieties of this as well as of the last species, known only by their native names, given to them in the different districts in which they are cultivated.—*Gardeners' Chronicle*, Aug. 17.

SCIARA.

M. Guérin-Méneville has published a very interesting notice on the migrations of the larva of a particular genus of Tipulæ, known by the name of Sciara. We are indebted to this learned naturalist for the following curious details, which introduce us to one of the most marvellous facts which the history of insects presents to us. The little larvæ of the Sciara are without feet, scarcely five lines in length, and the third of a line in diameter. The body is composed of thirteen segments, and the head is very small and black. In some years, during the month of July, there are met with, in the vicinity of the forests of Norway and of Hanover, immense trains of these larvæ, formed by the union of an innumerable host of little worms, agglomerated together by a glutinous matter. These associations of larvæ resemble some strange kind of animal, having somewhat the form of a serpent. It is, in fact, a living cord, many feet in length, one or two inches in thickness, and formed by the union of little creatures, holding on to each other in myriads, and moving together in one mass. * * M. Guérin-Méneville has observed some of these columns as much as thirty mètres in length. They proceed at a snail's pace, and in a determined course. If the column meets with an obstacle, as a stone for instance, it passes over it, turns round it, or even separates into two portions, which unite after having passed the obstacle. If a portion of the column be taken away, it becomes divided in two, but is speedily re-united by the advance of the hinder portion to the forward one. Finally, if the posterior extremity of this animated ribbon be brought into contact with the anterior, a sort of living circle is formed, which keeps on going round and round, sometimes for a whole day, before it becomes broken and can resume its progress. On touching this serpent of agglutinated larvæ, a sensation of cold is experienced. The phenomenon, so curious, so astonishing, of the union of a prodigious number of apodous larvæ, progressing by a common movement, resulting from the individual motion of thousands of little worms, was first made known, in 1603, by Gaspard Schwenefelt, who adds that the inhabitants of Liberia consider it as a precursor of a bad harvest, if they are found in the mountains; whilst a favourable presage is entertained if they descend to the plains. In 1715, Jonas Ramus speaks of the same phenomenon, and relates another superstitious notion attached to it by the peasants of Norway, who, when they encounter one of these movable columns, throw down in front of it some part of their dress, as their belt or their vest. If the Orme-drag, as they term it, passes over the obstacle, it is considered a favourable sign; whilst, if they pass round it, the result is sinister. * * M. Guérin-Méneville believes that these larvæ, which inhabit certain districts in vast numbers, in some seasons devour all the nutritive matters within their reach. Having thus exhausted their feeding places, they are forced to emigrate from them to seek at a distance new pastures, or probably with the object of undergoing their metamorphosis—*Athenæum*, translated from *Figuiers Les Insectes.*

LASTREA ÆMULA.

This scarce and beautiful fern rarely succeeds under cultivation, and hence we do not often meet with it in cultivation, or in collections of ferns at exhibitions. Numerous as are elegant plants amongst the species of ferns, few equal or surpass this in elegance, whether we note particularly its finely-divided, bright green fronds, or the gracefully half-pendant character of a fine specimen. It is the "hayscented" or "triangular prickly-toothed buckler fern" of the rustic herbarium; but as it is not the only hay-scented or prickly-toothed fern we have, such designations are delusions. In Newman's "History of British Ferns," it is described under the name of *Lastrea recurva*, elsewhere as *Polypodium æmulum*, and *Lophodium fœnisecii*. It has a stout, tufted caudex, and long, stout, wiry, dark brown roots. The stipes, usually about half the length of the frond, brownish purple, the rachis greenish, and stipes and rachis beset with small spherical glands. Fronds twelve to twenty inches long, rich bright green, drooping, gibbous lance-shaped or elongate triangular. The pinnæ opposite or alternate, the pinnules oblique, oblong, more or less pinnatifid, the margins lobed and toothed, the whole frond having a delicate crispy appearance. The fructification covers the whole of the under surface, and consists of round, brown spore cases, which add much to the beauty of this fern. It is evergreen, widely distributed, but only attains to a luxuriant condition of growth in mild, moist climates; hence, though occasionally met with in the east of England, it is never so beautiful as in the west. This circumstance gives the key to its cultivation. On the open rockery it rarely thrives, except in districts where it is found wild, in good condition; but in the cool fern-house, or the Wardian case, it grows freely, and requires absolutely no care beyond a needful supply of moisture. If never visited with a breath of air, it is none the worse; and, on the other hand, exposure to wind is decidedly injurious to it. Some years ago, when planting an artificial cave, under glass, with ferns, we inserted a plant of Lastrea æmula in a rather dark and obscure chink, where it could only be seen by looking for it. Now it protrudes beyond the opening, and throws out a graceful tuft of its elegant fronds in a most pleasing manner, and proving that the selection of a damp, shady, sheltered place is a matter of the first necessity in its cultivation. As to soil, light loam, with plenty of silver sand and pounded stone, will suit it exactly. The plant just referred to had not more than a handful of soil to begin life upon, and probably has insinuated its roots amongst the stone and brick of which the cave is constructed, and so has soil enough in what one may call the heart of the rock. The dried fronds emit an agreeable hay-scent for years after the date of gathering them.—S. H., *Floral World*, August, 1867.

The Lyre-bird.

The lyre-birds appear to be more jubilant and active either very early in the morning or late in the evening than at any other periods of the day, and the habits of the different species are very nearly alike. The most singular trait in their character is the extraordinary power they possess of imitating not only the voices of other birds, and the cries and yelpings of different quadrupeds, but sounds produced by man are as readily mocked by the lyre-bird; and it would appear, from the accounts brought us by those who are familiar with these curious birds in their native haunts, that the far-famed mocking-bird is a mere bungler in his calling when placed in competition with a lyre-bird. Prince Albert's lyre-bird seems to be at the top of his profession. "I once listened to one of these birds that had taken up its quarters within two hundred yards of a sawyer's hut, and it had made itself perfect with all the noises of the sawyer's homestead—the crowing of the cocks, the cackling of the hens, the barking and howling of the dogs, and even the painful screeching of the sharpening or filing of the saw."

Another singular custom they have is that of keeping in pairs, or alone: more than two are never seen together, and most frequently they lead solitary lives, except during the breeding season. They pair early, and commence building their nests in May or June. The solitary egg is laid, and usually in July the young bird is hatched. Their favourite building site is a ledge of rock high up from the ground, so that prowling egg destroyers and devourers of young birds may be defeated, or find it difficult to accomplish their thievish intentions. "The nest is constructed of small sticks, interwoven with moss and root fibres, the inside being lined with the skeleton fronds of the epiphetic fern, resembling horse-hair; and it is covered in, with the entrance at the sides." The single egg is very dark in colour, and looks as if it had been splashed with ink. During the first month of its life the young bird is covered with down, and it remains in the nest six weeks before it finally departs.

Whether the cock lyre-birds have rows for the sheer love of the thing, or do battle from jealousy, it is not easy to determine; in any case, they rival in fighting qualifications both game-cocks and the proverbially pugnacious quails.

The following account is copied from an Australian newspaper. The writer observes:—"In one of my rambles I beheld a sight which, to me, was grand in the extreme. In working my way through the tedious scrub, and being upon the brow of a hill, making my way to camp, I heard a din in the valley below which completely astonished me. As I neared it, the noise became abominable, and I wondered what it all meant. Knowing the shyness of bush-scrub animals, I sneaked nearer the scene of the noise, and came in view of as strange a sight as I have witnessed in all my life. About, near as I could guess, a hundred and fifty lyre-cocks were ranged in order of battle, and fighting with indescribable fury.—*Leisure Hour* for August.

Cockroaches.

To housekeepers, the most interesting information with regard to cockroaches would be couched in a short and simple recipe for effectually getting rid of them. Beetle-traps and poisons never do more than thin their numbers, which increase again with amazing rapidity when such means of repression are discontinued. They may, yet, be thoroughly exterminated, though the methods of accomplishing this desirable end seem to be known only to the professional destroyers of vermin. One of these Nimrods of the kitchen, being once engaged by the writer for this special purpose, took despotic possession of the basement floor for the night, occupied himself there for an hour or so in his murderous preparations before the family retired to rest, locked all up, taking away the keys, and, coming again at daylight next morning, swept up the victims in a mass of several bushels and carried them off. Not a single specimen of *Blatta orientalis* was seen in that house for the five succeeding years during which it continued to be our home.

Cockroaches generally swarm in great abundance on the premises of the baker, where any measure for exterminating them by poisons could not be safely hazarded. Some bakers keep a hedgehog or two for the express purpose of keeping them down, the hedgehog feeding on them greedily, and exhibiting remarkable vivacity, for him, in routing for them. There can be little doubt that rats, who will eat anything, are formidable enemies to cockroaches, and it has been noticed that wherever cockroaches are numerous rats will effect an entrance if they can. We had once a tame jackdaw who would snap up almost any number of cockroaches that could be offered him, but he was of little use in abating them, as he was usually at roost before they came out of their holes. It is probable that in their native East, where they are not compelled to resort to the dwellings of man to shelter them from the cold, these pests of our kitchens form a considerable proportion of the food of birds.

The male cockroach has wings about half the length of his body, though so far as we know he is never seen to make use of them. The female has only rudimentary wings; her young are hatched from eggs, which, however, she does not deposit in any nest, but keeps enclosed in an oblong case attached to her body. The eggs are generally about sixteen in number; the young escape from their oblong cradle by emitting a fluid, which softens a part of it and lets them out. They are active and alert when they leave their mother, though they are much less in bulk than the smallest emmets. Looking to the rapid increase of cockroaches in places favourable to them, it is plain that the female must produce her small broods with astonishing frequency.—*People's Magazine* for August.

New Books.

[*Our limited space must of necessity compel us to give but very short notices of new books, but they will perhaps serve as a guide as to what books our readers may ask for at their libraries.*]

The Practical Poultry Keeper. By L. Wright. London: Cassell, Petter, and Galpin. 1867.

In our number for July we gave a short notice of Mr. Tegetemier's Poultry Book; and we have now before us another work upon the same subject, which if not so elaborate is equally well worthy of attention. Mr. Tegetemier treats the whole subject in a philosophical manner, while the present volume is eminently practical, which cannot fail to make it of more value to one class of readers, and at the same time being much cheaper it will find its way into the hands of many who cannot afford to buy the more expensive one. Mr. Wright's volume will prove to be a valuable vade mecum, containing as it does exact and valuable hints upon profitable feeding and breeding, not forgetting the practical question of profit. We can safely recommend it to such as are in want of a guide, and who as we before observed cannot afford the more expensive Poultry Book; and to those who can afford it we may add that much information may be found in one that is not contained in the other. Both volumes are well worth having.

The Dogs of the British Islands: being a Series of Articles and Letters by various Contributors, Reprinted from the Field *Newspaper.* Edited by "Stonehenge." (Cox.)

A very attractive volume for all who are interested—and who are not—in the Dogs of the British Islands. Well illustrated and well bound, it is a volume fit to grace any drawing room table. It is divided into four sections: Dogs used with the gun, noticing Setters, English Pointers, Field Spaniels, and Retrievers; Companionable dogs, which treats of Terriers, Bull Terriers, Bulldogs, Mastiffs, Sheep and drovers dogs, Hounds and their allies; the third section illustrates the distinctive features of Blood-hounds, Foxhounds, Harriers, Beagles, Fox Terriers, and Truffle Dogs, whilst the fourth treats of Toy Dogs.

An Explanation of the Popular Weather Prognostics of Scotland on Scientific Principles. By the Rev. Charles Clouston. (Routledge & Sons.)

In this little pamphlet is discussed the various weather prognostics of Scotland, which were collected together by Dr. Mitchell, a fellow countryman of the author, who is a meteorologist of considerable experience, and well qualified to write upon this subject. In the book will be found several quaint quotations which add greatly to its interest.

AMERICAN, FRENCH, AND GERMAN WORKS.

Ornithology and Oology of New England: containing full descriptions of the Birds of New England and adjoining States and Provinces, arranged by a long-approved Classification and Nomenclature; together with a complete History of their Habits, Times of Arrival and Departure, their Distribution, Food, Song, Time of Breeding, and a careful and accurate Description of their Nests and Eggs; with Illustrations of many species of the Birds, and accurate Figures of their Eggs. By Edward A. Samuels, Curator of Zoology in the Massachusetts State Cabinet. Boston: Nichols and Noyes. London: Sampson Low, Son, and Marston. 1867.

The volume will be found to command the attentions of all lovers and Students of nature; the subject is somewhat limited but is thoroughly and exhaustively treated—it is well printed and admirably illustrated.

Sorghum and its Products. An Account of recent Investigations concerning the Value of Sorghum in Sugar Production; together with a Description of a new Method of making Sugar and Refined Syrup from this Plant. Adapted to Common Use. By F. S. Stewart. Philadelphia: Lippincott and Co. London: Trübner & Co. 1867.

This is a description of a plant that is now being largely cultivated in the middle states, and would seem according to the writer likely to become a formidable rival to the sugar cane of Louisiana. The processes of culture as adapted to different varieties, with the result in each case, the soils best suited, the manufacture and use of the products are well described. As a technical treatise it will be most valuable.

Seaside Studies in Natural History: Marine Animals of Massachusetts Bay—Radiates. By Elizabeth C. Agassiz and Alexander Agassiz. Boston: Ticknor and Fields. London: Trübner & Co. 1865

This little volume deals principally with the lower forms of marine life, with especial reference to those found on the shores of Massachusetts.

Essai sur l'unité des Phénomenès Naturels. Par Emile Saigey. Paris: Germer-Baililère.

An essay on the unity of natural phenomena. Most persons are aware that heat and motive force are now considered as equivalent—that is to say, a certain quantity of heat is transformed into a certain sum of force, and *vice versâ*. This law, suggested originally by the application of steam power to locomotion and to manufacturing purposes, has since been more carefully studied, and is found to rule every branch of natural philosophy. It would seem, in fact, that all the forces of nature are susceptible of being transformed the one into the other, according to certain laws which are nothing else than the laws of mechanics. Such is the idea developed by M. Saigey in this interesting treatise.

Etudes et Lectures sur l'Astronomie. Par Camille Flammarion. Paris: Gauthier-Villars.

These essays were originally published in the *Cosmos* and the *Revue Contemporaine*, and are intended to form a series. The sun, the state of astronomy in 1863 and 1864, the position of the planets in 1867, and an appendix of notes bearing upon these subjects, form the materials of which the present volume is composed.

Die Geschichte der Arier in der alten zeit. Von Max Duncker. Leipzig: Duncker & Humblot. London: Williams & Norgate.

This volume, commencing with the dawn of History follows the fortune of the Aryan race in India and Persia to the reorganisation of the Persian Empire by Darius Hystaspes. Especial attention is bestowed on the great religious systems—that of the Vedas and of Zoroaster, Buddhism. The history is, as many of our readers will be aware, a portion of a more comprehensive work. It is, however, complete in itself; and in its present revised condition, enriched by the results of recent investigation, is entitled to rank as a new treatise.

Ueber die Polarländer. Von Dr. Oswald Heer. Zurich: Schulthess. London: Williams and Norgate.

An interesting lecture on the Arctic regions, in which Dr. Heer gives an account of their fossil vegetation. The author is about to publish an extensive work on this subject. These inhospitable climes once enjoyed a temperature nearly analogous to that of Geneva, Dr. Heer rejects all the geological explanations which have been offered for this fact, and thinks we must look for a solution to cosmical changes affecting the entire solar system.

Die Abhangikeit der Insecten von ihrer Umgebung. Von Dr. L. Möller. Leipzig: Englemann. London: Williams and Norton.

Dr. L. Möller has devoted himself to the most minute scrutiny of the insects which have fallen under his notice. He has studied the manner in which they are affected by climate, by weather, by the soil on which they live, by the works of man, or by the modifications of the animal and vegetable life around them. He has observed the influence of various descriptions of food upon the tints of caterpillars, and registered the species of beetles that make themselves at home in ant-hills, the number of which within the sphere of his observation he finds to be precisely one hundred and seventeen.

BOOKS RECENTLY PUBLISHED.

Mushrooms and Toadstools; How to distinguish easily the Difference between Edible and Poisonous Fungi. With two large sheets containing twenty-nine Edible and thirty-one Poisonous Species, drawn the natural size, and coloured from living specimens. By W. G. Smith. 12mo, pp. 74, sewed, 6s. Hardwicke.

British Conchology; or, an Account of the Mollusca which now inhabit the British Isles and the surrounding Seas. Vol. 4: Marine Shells, in continuation of the Gastropoda as far as the Bulla Family. By John Gwyn Jeffreys. Post 8vo, pp. 460, cloth, 12s. Van Voorst.

The Henwife; Her Own Experience in Her Own Poultry Yard. By the Hon. Mrs. Arbuthnot. Pictures by H. Weir. Fifth Edition, price 7s. 6d.; plain Plates, 4s. 6d. Edinburgh: Thomas C. Jack.

Physical and Medical Climate and Meteorology of the West Coast of Africa. With Valuable Hints to Europeans for the Preservation of Health in the Tropics. By James Africanus B. Horton, M.D., Staff Assistant-Surgeon of H.M. Forces in West Africa. Price 10s. John Churchill & Sons.

The Forest and the Field. By H. A. L., "The Old Shekarry," Author of "The Hunting Grounds of the Old World," "The Camp Fire," &c. 1 vol. 8vo. With Portrait and Illustrations, price 21s. London: Samson Low.

Norway; its People, Products, and Institutions. By the Rev. John Bowden, late British Consular Chaplain at Christiania. Post 8vo, 7s. 6d.

Glaucus; or, the Wonders of the Shore. By the Rev. Charles Kingsley. New and Illustrated Edition, containing beautifully coloured Illustrations. Fcap. 8vo, cloth, gilt leaves, 5s. London: Macmillan.

A Handbook for Ladies on Indoor Plants, Flowers for Ornament, and Song Birds. By E. A. Maling. 12mo, cloth. 4s. Smith & Elder.

Letters Home from Spain, Algeria, and Brazil, during past Entomological Rambles. By Rev. Hamlet Clark. 8vo, pp. 162, cloth, 7s. 6d. Van Voorst.

Cattle and Cattle Breeders. By W. McCombie. 12mo, pp. 206, cloth, 5s. Blackwood.

Auvergne; its Thermo-Mineral Springs, Climate, &c. By R. Cross. Post 8vo, cloth, 4s. Hardwicke.

English Cyclopædia. Reissue. Arts and Sciences, Vol. 4. 4to, cloth, 12s. Bradbury.

Stories about Birds. By Mrs. Fairfield. Square 16mo, cloth, 1s. 6d. Hamilton.

Meetings of Learned Societies.

QUEKETT MICROSCOPICAL CLUB.

The second annual general meeting was held in the Library of University College, on Friday, the 26th ult. (July), Mr. Ernest Hart, President, in the chair. The report of the committee showed that the society now numbers 273 members, of whom 130 were elected during the year; that many papers of interest had been read. The treasurer's report gave a satisfactory balance, and in every way the club was in a very prosperous state.

The following officers were elected for the ensuing year:—President, Mr. Arthur E. Durham, F.L.S.; vice-presidents, Mr. Tilbury Fox, M.R.C.P., Mr. Ernest Hart, Mr. William Hislop, F.R.A.S., Mr. John K. Lord, F.Z.S.; treasurer, Mr. Robert Hardwicke, F.L.S.; hon. secretary Mr. Witham M. Bywater, hon. secretary for foreign correspondence, Mr. M. C. Cooke; committee, Mr. W. J. de L. Arnold, Mr. N. Burgess, Mr. S. J. McIntire, Mr. J. Slade.

Correspondence.

[*Under this head we shall be glad to insert any letters of general interest.*]

NAMES OF BIRDS.

SIR,—Would you allow me to say a few words in correction of a common error in the spelling and pronunciation of the name of a very common English bird? I refer to the *yellow-ammer*, which is very frequently written and pronounced *yellow-hammer*. Ammer is the German for bunting. The Germans call the bird the *goldammer*, or Golden Bunting. Yellow being the English equivalent for the German golden, the word, as written and pronounced *yellow-ammer*, has the evident and appropriate meaning of yellow bunting, and the words in both languages are plainly synonymous. Why any bird should be called a hammer I am at a loss to conceive, much more why this particular bird should be so called. What will Macaulay's New Zealander say about the yellow-hammer when he comes to make out its history as recorded in its name? He must either invent a fanciful derivation connecting the bird in some way with a hammer, or place it among his other examples of the capricious folly of the barbarians of the 19th century.

I spoke about this casually in conversation with some friends a day or two ago. One of them said he should not like to call the bird the yellow-ammer for fear of being supposed guilty of the vulgarism of dropping his *h's*. Another thought that custom fixes pronunciation and spelling, and that to depart from customary pronunciation and spelling, whatever they may be, seems pedantic. If we could persuade educated people to see the absurdity of the wrong and adopt the right method, both these objections would vanish.

Words are said to be the living records of the histories of things, and to preserve this record in its purity as regards one of our very common words, even at the risk of being thought pedantic, is the aim of these few remarks.

I am, &c.,
J. A. H.

Milesdown, Aug. 15.

Short Notes.

THE SWALLOW.—The chimney swallow (Hirundo rustica) is almost as much a household bird as the robin; it appeals to our better nature by the fearless confidence with which it seeks our dwellings as the sanctuary where its tender young will be safe; and this, combined with its gentle, pleasing manners, justly makes it a general favourite. Wherever the swallow is found it seems to possess the same instinctive confidence in man, and the same preference for buildings.

In this country a chimney is most generally chosen by the swallow wherein to erect its nest; but in this selection I have never observed it show any particular preference for a shaft in a stack of chimneys more than for an isolated one. I fancy the only condition which seems greatly to influence it in this respect is, that it shall not be one which is in constant use. In my father's house there was an isolated chimney, which certainly was not used more than once or twice a year, and for at least thirty years I never knew this without a nest. It was a short, straight shaft, up which when a boy I have often looked with longing eyes at the prize above; and once or twice I remember an unfortunate young one tumbling down into the empty fireplace when essaying to leave the nest on its first journey. There was a window at a short distance, nearly on a level with the chimney top, and I have spent hours, at various times, in watching the busy labours of the parent birds in constructing and repairing their nest. In some years the winter rain and snow would be so heavy as to demolish the frail structure, when a new one had to be built; in others it merely required a little patching, or a new lining of feathers, to make it habitable; but, with very few exceptions, the same angle of the chimney was always selected for the new nest, and it never varied more than a few inches in its distance from the top.

Though the swallow does not rank high as a songster, yet it has a very pleasing and melodious warble; it chiefly indulges in this early in the morning, even long before sunrise, or towards evening, and it is quite in keeping with the gentle character of the bird.

By what extraordinary instinct does the swallow and its congeners ascertain what weather is prevailing in this country, for such really seems to be the case? In some years, when the season has been backward, I have remarked a few pairs only arrive, and even these have seemed after a day or two to disappear. In the year 1849 the spring was particularly backward; April was cold and bleak, and unfavourable to the development of insect life; and not until the 11th of May did any of the hirundines make their appearance, on which day I first noted a few pairs of the common swallow and the house martin, but the main body did not arrive until three days afterwards. This was no local occurrence, for the same ungenial weather was general throughout England. In 1847 I noticed the same phenomenon, under precisely similar circumstances as regards the weather. A few pairs arrived on the 29th April, but immediately departed, and I saw no more until the 4th May, when I remarked a single pair of swallows; but these were not joined by the main body until the 6th.

By what mysterious system of telegraphy was the intelligence conveyed to the southern voyagers that their journey had better be delayed for a time? We boast of our wisdom and intelligence, but how little able are we to elucidate facts like these.

During the time of building I have often seen the swallows frequent the gutters, or any wet place in the village street, from whence they obtain the mud for their nests; their feet, however, and short legs do not very well fit them for walking, and I never saw one make more than two or perhaps three steps without using its wings. As soon as the young ones can fly they are in the habit of resting altogether on the branch of a tree, generally choosing a withered one, and I have seen the parent bird feed them while thus perching as she passed on the wing.

The swallow is very vigilant to detect the presence of any bird of prey; one or two wild hurried shrieks are uttered by the first who becomes aware of the danger, the call to arms is immediately obeyed, and in a few seconds all within hearing the note of alarm are gathered together, and fly wildly about their enemy. I have noticed that the cuckoo is pursued in this way quite as much as any of the hawks.

How strange it is that the idea that swallows wintered in the mud at the bottom of ponds and rivers should ever have been a matter of belief with intelligent and scientific men, and have been so long and pertinaciously held! A swallow is no more fitted to live under water than any other bird, and a single actual experiment would at once have demonstrated the absurdity of the theory—one which even yet is not entirely exploded. That some swallows have been found during the winter in a dormant condition has often been proved. These are most likely late-hatched birds; but I think it is very questionable if they ever survive the winter in a torpid state, and when such have been accidentally disturbed and roused into temporary activity they almost immediately disappear again, and doubtless perish from want of food. In January, 1842, I knew of an instance in which a pair of chimney swallows fluttered out of the thatch of an old barn which was being pulled down. They seemed in great distress, and after flying about the place during that and the following day, nothing more was seen of them.—*Field*, August 27th.

A RATTLESNAKE AT LARGE.—The following about this appeared in *Land and Water*, August 10th:—A rare bit of penny-a-lining copied from the *Liverpool Daily Mercury*, has been going the round of some of the newspapers under the above heading, which must indeed excite the consternation of our American cousins who dwell in the land of the rattlesnake. Such nonsense is not worth repeating in our columns; but people are, in general, so very ignorant about snakes, that they will believe anything said of them, no matter how absurd the exaggeration. Be it understood that the rattlesnake is a sluggish reptile, by no means rapid in its gait, and most easily disabled by a blow on the spine. It does not spring its rattle when in the act of progression, and one that had really got loose would immediately make for the nearest retreat, and be somewhat difficult to dislodge therefrom. A few weeks ago, a man (one Joel H. Bowkley) brought a large quantity of rattlesnakes to this country, which he has been taking about to the different dealers in live animals for menageries, exhibiting the fangs that had been extracted from them, and handling his fangless rattlesnakes with the utmost *nonchalance*. It seems that eight of these snakes were purchased by Mr. Manders; and the story is, that one of them got loose the other day in his travelling menagerie, then staying at Tunbridge Wells. Not long ago there was a tale about three gorillas (!) having escaped from this proprietor, which alleged gorillas turned out to be three young Cape baboons (*Cynocephalus porcarius*), animals about as dangerous to handle and secure at their age as so many puppies. Something sensational was now, in turn, required as a puff for the rattlesnakes; and, accordingly, with a squad of keepers behind it, armed "with shovels, forks, scrapers, brooms, &c.," we are told that "the reptile leisurely proceeded up the centre of the inclosure, hissing fearfully all the time. On arriving opposite the caravan containing the bonassus, a species of buffalo—an immense animal, weighing upwards of two tons" (the weight of a fine bull of its kind, *i.e.* the American bison, being about 14 cwt.!), "the rattlesnake made a spring, fastened" (!) "on the bonassus, and bit it in the left nostril. The reptile then let go its grip" (grip !), "and, shaking its rattles" (!) "glided through an opening between two of the caravans, where some of Mr. Manders's grooms were filling a cart with straw. To this cart was attached a fine horse. The rattlesnake fastened" (!) "on the off-fetlock of the horse, which immediately plunged and reared to such an extent as to shake the reptile off" (!), "and before it could move away it was crushed to pieces beneath the hoofs of the horse." Of course the two large quadrupeds died in the course of a few minutes, in frightful agonies, "and were buried in a field just outside Tunbridge Wells in the latter part of the same day." It is a curious circumstance that Mr. Manders's bull bison was afterwards seen alive in the possession of Mr. Rice, the dealer, in Ratcliffe-highway, who, it is rumoured, received it in part payment or exchange for three young giraffes! So many parts of the story are palpably false that we incline to disbelieve the whole of it. It is not true that any snake holds on with a "grip," like a bull-dog. The stroke and withdrawal of the fangs are instantaneous; and that a rattlesnake with its fangs extracted (as we believe in the present instance—will Mr. Manders permit of the mouths of his seven others being examined!) would kill a mature bull bison and a fine horse in succession, may do very well for people who have not the necessary knowledge to criticise, but is quite incredible to the naturalist. The carcase of a fine bull bison, too, we should expect, was considerably too valuable to be buried out of the way. The skeleton would surely be sold for some museum, and the meat would be nought the worse for feeding Mr. Manders's carnivora.—Z.

INDIAN SCENERY.—We could scarcely have chosen a better morning for our excursion. The sun was gilding the snow-covered peaks of the northern Pinjal as we commenced the ascent, and by the time we had gained the temple, his rays, in one flood of golden light, had illuminated half the valley, leaving the southern portion and the slopes of the Peer Pinjal yet intact. Seldom does he shine on more varied and beautiful scenery, for in all my wanderings before and since I have never witnessed its equal. There lay the capital at our feet, half hidden among clusters of poplars, chunars and forest trees—the Dul lake, washing the western base of the Tukt-i-Salaman, stretched westward with all its ever-changing forms. On the placid waters of the lake numerous skiffs shot either rapidly along, or threaded their way through a labyrinth of weeds, diversified by the countless floating gardens, and the Isle of Chunars with its noble plane-trees. The shalimar and pleasure-grounds of the Delhi Emperors, now fading and fast passing into the wild jungle around them, covered portions of the northern bank of the lake. Huri Purbet, like a fortress which had undergone a siege, its walls crumbling into decay, stood on the site of a spur overlooking a scene which for loveliness and grandeur has scarcely an equal. So perfect seemed both the natural and artificial portions of the panorama, so faintly blending with each other, and yet so grand, that the eye in one sweep passed over the most perfect pictures of lake and mountain scenery. Towards the city stretched a noble avenue of poplars, upwards of a mile in length, and straight as arrows; whilst away towards the east rich pastures and fields teemed with grain; villages nestled in clusters of trees, which in rows were seen fringing the banks of the classical Hydaspes, that like a huge snake twisted through the plain. Then, last of the many beauties, rose those grand and noble mountains, encircling the whole panorama, and shielding the paradise from the northern blasts, whilst from their rugged sides dashed a thousand rills to fertilize and beautify its soil.—*The Forest and the Field.*

MIGRATORY BIRDS.—It is familiarly known, says a correspondent of *Land and Water*, July 27, that, as a general rule, our feathered summer visitants return year after year to the exact same place, and the young to the site of their nativity in the first instance. It is unnecessary to cite instances of this repeatedly observed fact, which nevertheless seems quite inexplicable. The birds which visit us in winter must, for the most part, necessarily range about more, and of course they proceed further towards the equator, when the temperature renders this needful. Still, the tendency would seem to be for the same individuals to visit the same places year after year, a fact well illustrated by a statement quoted by the late Mr. Yarrell, which I here transcribe. "In the year 1833, a woodcock, with white feathers on the wings, was observed in a cover on the manor of Monkleigh, near Torrington, in the county of Devon. The same bird, or one of exactly similar plumage, reappeared in the same place during the four succeeding seasons, in which period it was so repeatedly shot at by different persons without effect, that it at last acquired among the country people the name of 'the witch.' In 1837 it was killed, and the specimen preserved." In this instance, a peculiarity of plumage rendered the individual bird recognisable; and perhaps you may know of other instances of the kind, which I shall be glad to learn of. Bewick relates a similar instance of a white woodcock having been observed in the same cover for three successive seasons. Tame gulls, also, that had left the place where they were reared, during the breeding season, have been known to return afterwards, and bring their families with them. Many years ago, we remember that some coots, which had become quite tame upon the water in St. James's-park, left for the breeding season, and made their appearance afterwards.

VULTURES IN INDIA.—Amid all the grandeur of the Himalayas, it is a most attractive sight to the naturalist to behold the vultures and rapacious birds soaring over the vast ravines and around the tops of the mighty mountains. Let him choose a summer evening, with that clear blue sky almost characteristic of the Himalayas, and just as the sun casts its last rays on the snow-clad mountains—when the quiet is only broken by the cry of the eagle, the bleat of the goat, or the shrill pipe of the black partridge—then the vultures, kites, and jackdaws may be seen wheeling in vast circles; some are gliding along, apparently without an effort, others appear suspended motionless in the vast canopy of heaven; while, careering in his majesty, the lammergeyer *(gypaëtus barbatus)* gathers up his great wings and stoops downwards, may-hap to rise again and join the medley he has just left, or stretching forth his pinions to their fullest extent, he sails along the mountain brow to the projecting cliff on which his eyrie stands safe, for there who dare assail him? He is usually observed sailing leisurely along the mountain side, now and then flapping his great wings when he wishes to mount higher; but let a govind-kite, or Indian jackdaw annoy him, then, with a rushing noise like that of a fierce wind, he stoops with a grace truly grand and beautiful. Oft when clambering along a rocky precipice, picking every footstep with studious care, and daring not to lift my eyes for fear of making a false step, have my ears been assailed by the furious rush of the lammergeyer, and a feeling that if he only touched me with his pinions I would have rolled into the yawning abyss below.—*The Naturalist in India.*

CINNAMON.—The soil of the cinnamon gardens is a loose white sand: localities near the sea are considered to be the most favourable to the growth of cinnamon. The blossom is of a pale-greenish colour, closely resembling mignionette, and the berry is formed like the acorn, and about the size of a small damson, of a deep purple hue. It ripens at the end of autumn, and is gathered by the natives for the purpose of extracting oil from it. The bark of the branches might be mistaken for that of the hazel, so close is the resemblance; and the young leaves are of a deep crimson, changing gradually to green, having three fibres running lengthwise. When chewed they have the taste of cinnamon. It is not true that the cinnamon groves impart a smell to the air, the spice being contained between the outer bark and the wood. In the process of preparing the cinnamon the peelers select such branches as are sufficiently old, and lop them off with a large pruning knife, the blade being convex on the one side and concave on the other. The convex side is used in loosening the cinnamon from the branch, when it appears in the form of a tube, open at the one side, into which the smaller tubes are inserted, and afterwards spread out to dry in the sun. When dry it is made into bundles, weighing about thirty pounds each, bound up with split bamboo twigs, and carried to the stores, ready for exportation.—*People's Magazine* for August.

FOOD FOR PARROTS.—With respect to food for parrots, I knew one treated and fed by a gentleman for upwards of forty years without the bird ever moulting, and it never shed but one feather at a time. This bird was a very splendid one, and its plumage very much studied by the owner, who was a good judge of birds, and understood the kind of food they ought to eat. He used to say he was certain it was the hemp-seed people principally fed parrots on that caused them to pick off their feathers and spoil their plumage; therefore Polly was not allowed to have but a very small quantity, although most birds are very fond of it. The way this bird was fed was this. Toast crust soaked and squeezed nearly dry again, with about a ¼oz. of maw seed sprinkled over it was put into a nice clean washed tin box, with a parting in it; then in the other half about ¼ pint of canary, Indian corn, paddy, and a small quantity of sunflower seed, and never more than about one dozen grains of hemp-seed; all this should be thoroughly sifted, as the dust itself is enough to make them itch, particularly the dust from the canary-seed; if you only put your hand down a sack of it, you will find your arm itch for hours. No meat should be given them; they are very fond of the leg-bone of a fowl now and then, to amuse them, but the meat should be cut off very close. They should have a shower-bath every now and then, over cage and all; they are very partial to a bath in summer time. The cage should be wiped and put into a warm room to dry, and be fresh sanded; it should be cleaned out every morning and red bird-sand thrown over the bottom; this was the way the bird was treated, as it was my duty to attend to it, which I did for four years.—H. B. in *Land and Water*, August 3rd.

TOADS.—An old lady of the writer's acquaintance possessed as pets a number of toads, which she kept in some rockwork in her garden, and had tamed by degrees in the following manner. She would catch and imprison the toad she intended making a pet of under a flower pot, and then liberally supply it with different kinds of food such as toads delight in, particularly bread crumbs, which, in the absence of the old lady, the prisoner greedily devoured. It would soon, however, lose its habitual shyness, and upon lifting up the flower-pot the toad would first eat in her presence, and at length take from her hand the food she offered. As soon as this stage in the taming process was reached the old lady would turn out the captive into the society of other toads among the rockwork. Twice a day, during the warmer months of the year, did she approach the abode of her pets, when they would come forth from their hiding places, and eagerly devour whatever she threw to them. They quickly learned to distinguish her footsteps on the gravel walk from those of all other persons, and came fearlessly out of their holes to greet her. It is curious that these reptiles did not become torpid for some weeks after all their untamed kindred had disappeared from view.—*People's Magazine*, August 3rd, 1867.

THE VOLVOX AND ITS PARASITE.—In examining with the microscope some specimens of "Volvox globator," one was found containing one of the Rotifera, a female of *Rotommata Parasitica* (mentioned by Pritchard as sometimes found in such a situation). When first seen it was feeding, picking out the green masses composing the Volvox, and swallowing them, occasionally shifting its position and selecting a fresh spot. Two eggs had been deposited, and another could be seen in the ovary; they were of a reddish tint, and filled with granules. There was no sign yet of organized structure. Twenty-four hours after, the Rotifer was dead, but the young could now be plainly seen moving in the eggs, and cilia were in rapid vibration at two distinct points. While still under examination, one of the young broke through the envelope surrounding him, and, after a few energetic struggles, was freed and swimming rapidly about the interior of his prison, but did not appear to make any attempt to leave it. The egg-shell or membrane left behind was very delicate and transparent, without dots or markings, the aperture broken off by the animal being plainly visible. The other egg would have soon hatched, as the animal was in active motion within it, but unfortunately the water leaking out of the live-box containing it, put an end to the observation. The Volvox did not seem disturbed by its strange occupant, but continued its stately revolutions as though they were not present.—B. WEBB, JUNR. in *The American Naturalist*, July.

MICE IN CORN-BIN.—One day last week (we read in *Land and Water*, July 20th) the coachman of a friend of mine called his attention, and asked him if he could tell what that was, pointing to a moving mass in a corn-bin, which had been cleaned out the day before, and was empty. There being two dogs and three cats always about, he said, "One of your dogs, I suppose." "No, sir, they are mice." The mass was about eighteen or twenty inches long, and about half that in width and height, and was moving and rolling, caused by the under mice trying for air. A cat was put into the bin, but she cut off pretty quickly. A terrier was then put in, and at it he went. There were hundreds in this mass, but none got away. The whole of this lot came there in the night, and what brought them there, and from whence could they have come? He told me he once saw one of his ferrets have a stand-up fight for twenty-five minutes with a rat, a noted old rat that lived under a big stone in a churchyard and had beaten several ferrets off.

THE SENSITIVE PLANT.—The cause of the movements of the Sensitive Plant, says the *London Review*, Aug. 10th, can hardly be considered decided. Some say it is not true contraction, but merely a motion of fluid! Others, that it is accompanied by electric changes, and is, therefore, allied to muscular motion. The observations which M. P. L. Bert publishes, throw hardly any new light on this question; they indicate, however, one important point, viz., that the natural and regular movement of the leaves is produced by a different cause from that of sudden contraction resulting from contact with the fingers. Either seems to have no effect upon the former, but it produces an anæsthetic effort which prevents the latter.

CLIMATE OF LAGOS.—For hundreds of miles the whole line of the adjacent coast is one continuous mangrove swamp, intersected by lagoons, from which fœtid exhalations, caused by the rapid decomposition of animal and vegetable matter, rise and hang over the land like a dense fog. The sun, seen through this noxious vapour, loses none of its power, but looks, even at mid-day, as if it was obscured by ground glass. At such a time, the hot, damp, fœtid air seems to clog and impede the free action of the lungs, and one feels that its impurities are pregnant with disease. Any one who has entered the damp hothouse of Kew Gardens, after it has been shut for some time, may form some slight idea of the atmosphere of this part of the coast.—*The Mountain and the Field.*

A BURNING WELL.—A burning well has just been discovered at Narbonne, by workmen engaged in making borings for an artesian well. The water, which is charged with sulphate of magnesia, gives off in considerable volumes carburetted hydrogen gas, which burns with a reddish smoky flame, but without emitting a smell of either bitumen or sulphuretted hydrogen. The "sinking" for the spring was made on the left branch of the Aude, in a plain situate about two metres above the sea-level, and composed of alluvial mud. The alluvial mud extends to a depth of six metres, then follow tertitary lime-stones and marls, with the remains of marine shells. At the depth of 70 metres, the spring containing the inflammable gas was met with.

NIGHTINGALES.—It is stated by a correspondent of the *Pall Mall Gazette* that "an unusually large number of nightingales assembled during the late spring in the vicinity of Naumburg. They settled about the middle of April in groups of from twenty to thirty in a wood, and remained there eight days. During this time they held a sort of musical tournament, two birds singing solo alternately, and the performance being occasionally varied by a chorus in which all the birds participated. It is positively asserted by ornithologists who were present at this singular concert that there was not a single female bird among the singers. Every now and then the birds moved in a body to another part of the wood, as if to test its acoustic properties."

THE SILKWORM DISEASE.—The continuance of the silkworm disease in France, we read in the *London Review* of Aug. 10th, stimulates scientific men to experiment with a view to the best means of detecting and of curing the malady. The method of detection proposed by M. Pasteur, in which the caterpillars are crushed in a mortar and then examined under the microscope, is crude and expensive. M. Balbiani therefore suggests a better mode of diagnosis. When in the chrysalis state, a very small portion of the projecting process which represent the future wing is snipped off with a pair of scissors, and is placed under the microscope; if now the larva be diseased, the peculiar pebrine corpuscles can be distinctly seen. The advantage of M. Balbiani's method is that it does not involve the death or injury of the silkworm.

SANTORIN.—A letter lately received states that the volcanic disturbances at Santorin have not yet ceased. The new lands which have been raised continue to extend towards the south, and are now within four or five metres of the north of Micra-Kamméni. Formerly the channel was twenty-one inches deep, but it is now not more than three. The island of Aphroessa remains stationary, but Vattia is now divided into two islands. Around the newly-formed lands the sea is of a yellowish-green colour, and has a temperature varying according to the locality, from 25° to 75° centigrade. M. Cigalla, who has studied the volcanic phenomena very carefully, thinks another great eruption will soon occur, and that a true volcanic crater will be formed at the top of the George island.

RODENTIA.—"Cosmos," in an article on "Rodentia," says that the distribution of the rat and the rabbit, which are the two most prominent members of that family, present some remarkable peculiarities. Thus the maximum of these animals is to be found in America, and the minimum in Australia, so that if we take Australia for a unit we have the following scale: —Australia 1, Europe 3, Africa 5, Asia 11, America 18. Polynesia appears to be entirely free from the family. There are at least six times more kinds in the temperate than in the frigid zone; America possesses ten times more than our continent, and there are only 13 kinds which are common to both hemispheres.

SPIDER AND WASP.—Last autumn the writer witnessed a curious combat between a large spider, of the species called in Suffolk the "death's-head" spider, and a fine wasp. The wasp had become entangled in the spider's web, who very cautiously, gradually, and most warily approached its victim, and not without reason, as the sequel shows; for no sooner had the insects closed in mortal combat, than they both fell dead to the ground at the same instant. The sting of the wasp must have entered the body of the spider at the precise moment the latter gave the fatal bite.—*People's Magazine*, August 3rd, 1867.

VITALITY OF SEEDS.—A remarkable instance of the well-known vitality of seeds may be now seen at the Paris Exhibition, a great variety of plants foreign to France having sprung up under the walls and around the buildings in the Park, the seeds of which have been conveyed to Paris in packages from various countries. Especially around the house of "Gustavus Wasa" several plants may be seen which are peculiar to the country of that monarch.—*Athenæum*, July 27.

Remarks, Queries, &c.

(*Under this head we shall be happy to insert original Remarks, Queries, &c.*)

Curious Snake Story.—At the request of Mr. Jowett with Messrs. Brownlow & Stark, naturalists of this town, I have great pleasure in replying to your enquiry respecting the snake and mouse.

I have had the ill luck to lose both. The mouse made his escape and the snake died. The glass front to the box where I kept them was drawn up in slides at the ends it. I appeared to me on first missing the mouse, that the glass had not been put tight down, and the mouse, a half-grown one, got out; this was about ten days after eating the snake. The box that they were kept in was put on a stand in our garden, because the snake smelt so strong in the house. The box was left out all day in the hot sun unknown to me; this, with the snake eating nothing, the poor thing sickened and died fifteen days after he was partly eaten. I give you the names of two parties, both earnest lovers of nature as well as myself, who witnessed what I have stated—John Scott, stone-mason, Sheffield, and Thomas Marsten, joiner, Blackburn.

Yours truly,
John Potts.

The Ring Dove, or Cushat.—This beautiful bird is found throughout the whole of Great Britain and Ireland. It frequents mostly the woodland districts, where it does a great deal of mischief by feeding on grain and other agricultural produce; therefore it cannot be considered a friend to the farmer. Its nest is generally found amid the thick branches of the beech or pine, and is composed of a few sticks loosely put together. It lays two eggs, and generally rears two broods in the season. It is easily tamed, but will never breed in confinement, nor has it ever been known to cross with any other variety. I have tamed several, one of which I keep in the same cage with a kestrel. While feeding the hawk, one day last month, with *raw cow's liver*, the pigeon much to my surprise, seized the meat from his very mouth, and before I could remove it had swallowed a large piece. I thought this very strange, as it had formerly been fed on grain, bread, &c., and had never tasted meat of any kind since it left the nest. I have since fed it for days together entirely on flesh, which it likes better than any other food. This proves that it is not entirely granivorous. At feeding time it has to be removed from the cage, or it would not let the hawk eat at all.

Mavisbush House. J. D. S. W.

Woolhope Naturalists' Field Club. — A society was formed in 1851, under this name, for the practical study, in all its branches, of the natural history of Herefordshire and the adjacent district. Meetings of this very useful and flourishing club take place periodically, and one of these was held on the 18th inst., at the Craig-y-pwtt du Waterfall, in Radnorshire. A goodly number of members and also of ladies attended, and the proceedings were of a very interesting nature. The Bach-howey stream, on which the beautiful waterfall is situate, here divides the lower and upper Ludlow strata, and the spot was peculiarly interesting to the geologist. The oak fern, Polypodium dryopteris, and all the common ferns grew on the side of the deep gorge in abundance. After a picnic luncheon on the grass a paper was read by Dr. Bull, on "Yew-trees and the Church;" and by the Rev. T. W. Weere, on "Recent Astronomical Observations."

Snake and Toad.—On the 30th of July I surprised a snake on a gravel path in our garden attempting to swallow a toad. The snake measured 18 inches, and the toad was at least twice the size of his mouth. The snake had succeeded in getting the toad half into his mouth, head foremost, although he was struggling violently and evidently not liking the treatment. On seeing me, the snake let go the toad and tried to be off, but the gardener perceiving him killed him. The toad on being released remained for some time stupified, but when placed in a pan of water, speedily revived; he however had lost one leg in the struggle. I cannot think how the snake managed to get the toad into his mouth, as his mouth was very small and the toad nearly full grown. M. L. A.

August 11th, 1867.

The Tallow Tree.—In answer to Mr. I. S. asking on page 57 of the "*Naturalist's Note Book*," for any information on the Tallow-tree, I give what I know of it. This tree is a native of China. It grows to the height of the pear-tree, and is very like it in shape. The most singular part of this tree is the fruit, which is enclosed in a husk like that of the chestnut. When this fruit is ripe it opens, showing three white grains which contain the beautiful tallow. The tallow is procured by boiling the seed (after having been bruised) in water, and collecting the oily matter which floats on the surface. If Mr. I. S. wishes further information on the subject, he can procure it from a book entitled "*Timber, Trees, and Fruits.*"

Mavisbush House. J. D. S. W.

CURIOUS POSITION OF A FLYCATCHER'S NEST.—In the beginning of July, a spotted flycatcher built a nest at the back of a straw target that was daily being used for archery. She laid four eggs and began to sit. Every day the nest was moved to a neighbouring flower bed, as the bird would have been shot through by the arrows if the nest had been allowed to remain at the back of the target, and when the shooting was over it was replaced. The bird never minded it, but always went back to the nest when replaced, although she never sat on it when in the flower bed. I regret to say that a gale of wind blew down the the target and destroyed both nest and eggs. It would have been interesting to see if the bird would have hatched her eggs and reared her young. M. L. A.

August, 11th, 1867.

THE BARN OWL.—Although this owl, as well as the other species in general see far better at night than in the day time; yet when taken young from the nest, they sometimes get so accustomed to the light that they seem to prefer it to the dark. One that I have at present, when shut up in a dark closet during the day, becomes restless and struggles to get free. But when released it is contented and playful, and well deserves the name of "*flying kitten.*" It does not at all object to sunshine. This bird, although some months old, never screeches. A Long-eared owl, too, kept by a friend of mine for three years, was never known to hoot. Perhaps some of your correspondents could inform me whether owls ever utter their notes in confinement, and if it is the male only that does so. R. W. B.

JUVENILE MUSEUMS.—In order to encourage a taste for natural history in the northern counties of Northumberland and Durham, a committee of naturalists at Newcastle-on-Tyne have offered a series of prizes for the best collection of plants, shells, fossils, and other objects. Various conditions of competition are published for the collectors, who must be under seventeen years of age. The late Professor Henslow established similar prizes in his Cambridgeshire parish many years ago. The example deserves to be widely followed, and we hope to see prizes in our public and private schools given for natural history as well as for Latin hexameters, Greek iambics, athletic exercises, and other miscellaneous competitions.

STATE OF THE WEATHER NEAR LONDON.

July and August.	Moon's Age.	BAROMETER.		TEMPERATURE.					Wind	Rain.	REMARKS.
				Of the Air.			of the Earth				
		Max.	Min.	Max	Min	Mean	1 foot deep	2 feet deep			
Thurs. 18	17	29.577	29.487	68	50	59.0	63	60	W.	.06	Rain; low white clouds; fine at night
Friday 19	18	29.745	29.574	65	52	58.5	62	59	W.	.01	Cloudy and boisterous; cloudy throughout.
Satur. 20	19	29.802	29.682	70	52	61.0	62	59	W.	.13	Clear; partially clouded; rain at night.
Sunday 21	20	29.643	29.605	72	51	61.5	63	60	S.W.	.02	Cloudy; partially clouded; cloudy.
Mon. 22	21	29.672	29.651	74	53	63.5	64	60	S.	.29	Rather boisterous; fine, with white clouds; rain.
Tues. 23	☾	29.612	29.598	72	48	60.0	64	60	S.	.02	Cloudy; showery; heavy showers at night.
Wed. 24	23	29.739	29.640	71	43	57.0	64	61	S.	.00	Very fine; cloudy; fine at night.
Thurs. 25	24	29.842	29.695	75	52	63.5	63	60	S.E.	1.48	Very fine; cloudy and fine; rain at night.
Friday 26	25	29.860	29.575	58	47	52.5	64	60	N.E.	.40	Constant heavy rain; boisterous, with rain; rain.
Satur. 27	26	30.047	29.924	64	41	52.5	61	59	W.	.02	Cloudy and cold; densely clouded; very fine.
Sunday 28	27	39.061	29.130	71	40	55.5	61	59	N.	.00	Fine, with low white clouds; fine throughout.
Mon. 29	28	30.064	30.000	65	38	51.5	61	59	N.	.00	Hazy clouds; fine; cold at night.
Tues. 30	29	30.027	29.989	72	44	58.0	61	59	N.	.00	Hoar frost early; rather cloudy; fine at night.
Wed. 31	●	29.973	29.945	72	43	57.5	61	59	N.E.	.00	Fine; dry haze; fine.
Thurs. 1	1	29.982	29.934	62	49	55.5	62	60	N.E.	.00	Dry wind; overcast and cold; overcast.
Friday 2	2	29.992	29.962	57	36	46.5	62	60	N.E.	.00	Overcast; cold; very fine at night.
Satur. 3	3	30.020	30.019	73	48	60.5	60	59	N.	.00	Overcast; fine; cloudy and warm.
Sunday 4	4	29.992	29.936	76	45	60.5	61	58	S.W.	.00	Very fine; fine; cloudy, but fine at night.
Mon. 5	5	29.995	29.897	73	41	57.5	62	59	S.W.	.32	Very fine; fine; densely overcast; rain.
Tues. 6	6	29.935	29.717	66	44	55.5	61	60	S.	.39	Rain; constant rain; fine at night.
Wed. 7	☽	29.762	29.670	70	53	66.5	60	59	W.	.28	Fine; heavy clouds and showers; fine; rain at night.
Thurs. 8	8	29.687	29.670	74	56	65.0	60	59	W.	.03	Densely overcast; cloudy, with showers; fine.
Friday 9	9	29.792	29.748	70	43	56.5	62	59	W.	.00	Fine; very fine throughout.
Satur. 10	10	30.080	29.946	70	45	57.5	64	60	W.	.00	Clear and exceedingly fine; very fine at night.
Sunday 11	11	30.006	29.935	79	53	66.0	64	59	S.W.	.00	Very fine throughout.
Mon. 12	12	30.069	29.958	84	50	67.0	64	59	S.	.00	Very fine; clear and hot throughout.
Tues. 13	13	29.959	29.922	86	54	70.0	65	60	S.E.	.00	Very fine; cloudless and hot; fine at night.
Wed. 14	14	29.948	29.736	91	61	76.0	66	62	S.	.18	Very fine: hot and cloudless; overcast; moonlight, with misty haze.
Thurs. 15	○	30.031	29.887	84	54	69.0	67	63	S.	.27	Rain; showery; slight rain at night.
Friday 16	16	29.800	29.615	75	54	64.5	66	63	W.	.00	Densely overcast; fine throughout.
Satur. 17	17	29.850	29.842	70	54	62.0	66	62	S.W.	.00	Cloudy; partially overcast and fine; cloudy.
Sunday 18	18	30.000	29.986	73	53	63.0	65	61	S.	.00	Overcast; cloudy; very fine at night.
Mon. 19	19	30.071	30.014	80	58	69.0	65	61	S.	.81	Very fine; exceedingly fine and hot; continuous storm of thunder, lightning, and heavy rain.
Tues. 20	20	20.073	29.990	81	51	66.0	66	62	W.	.00	Densely clouded; very fine; clear.
Wed. 21	21	29.985	29.960	82	53	67.5	65	63	W.	.00	Clear and fine; exceedingly fine throughout.

BIRDS OF THE EAST.

EVERYWHERE, the early morning is made beautiful by birds. Refreshed by sleep, they emerge from the bosom of darkness, and hail with rapture the renewal of light. If, then, you take your stand on some lofty slope of Gargarus, and look eastward, you behold the whole mighty level of Asia Minor bathed in purple light, while behind the peaks of Caucasus, the reflection, as of a universe on fire, kindles the whole orient. You then appear to be watching the advent of creation, the tremulous blushing of earth and heaven in the overpowering presence of the Deity, who flings profuse splendour and glory over his nascent works. As you think and meditate, the wail of some solitary jackal awakens the echoes among the hills; the cawing of rooks overhead carries you by association to far western lands, though the force of your imagination is soon checked by the approach of birds of gorgeous plumage from beyond Sahara and the Mountains of the Moon. What balmy freshness then fills the air, what scent of wild-flowers, what incense from the young buds, from the pine, from the cedar, from the fir, from the fragrant linden, from the white-blossomed acacia, from the majestic and regal Vallona oak! If you go down by Ephesus or Miletus, you are encountered at certain seasons of the year by large flights of cranes, which, having done their work in Mozambique or Abyssinia, are coming northward to make war upon the frogs in the quagmires of Asia Minor. Yonder, amid the evergreen foliage of the arbutus, with its shining blossoms, or rich red fruit, which scents the air like a heap of strawberries, you perceive the golden-crested hoopoe, preferred by the ancient Greeks before the eagle, as the truest claimant of the bird-sceptre. To see this bird in his real home, you must cross the Ægæan, and take up your stand amid the leafy glades of Parnes or Cithæron, whither of old he retired from the bustle of Athens, to exercise his authority in peace. As a king, he could not but dislike the noise and license of a popular government, where everybody was his own king, and, as our neighbours express it, governed himself *tant bien que mal*. Several of his subjects were suspected of cherishing a hankering after the uplands of Hymettus, for sinister purposes — they were partial, it was thought, to the flavour of honey; and as the bees there piled up their fragrant white combs, scenting the mountain and dripping with pellucid dew, the honey-sucker and several of his companions hovered constantly over the beds of wild thyme and took advantage of every opportunity to dip their little bills in forbidden sweets. The old comic poet of Attica, whose imagination rivalled that of Shakspeare in richness, suggested a very strange project to the birds of his time. The divinities of Olympus, and especially their monarch, Zeus, having grown somewhat exigeant, he counselled the subjects of the hoopoe to erect a vast metropolis in the air, and by spreading out their wings on all sides, to hinder the ascent of the fumes of sacrifices and smoke of incense, on which the Olympians were supposed to live. By this means, he affirmed, the gods would soon be brought to reason, and made to understand that they depended entirely upon man for the supply of their larders. In the development of this grotesque fancy, the Athenian dramatist brings together all the birds of Greece, many of whose characteristic notes are distinctly heard in his verses, twittering, chirping, or pouring forth their liquid voices in song.

It is difficult to connect any idea of happiness with cold. To enjoy life, you must have a genial atmosphere which enables the heart to perform its functions with a thrill of satisfaction, and sends the blood tingling with pleasure through the veins. We talk of the merry month of May, of leafy June, of scorching July, of golden August; but the true type of the North is a man standing in a doubtful attitude, with one eye on the clouds, and the other on his umbrella, which he keeps ready to flap up at any moment against a shower. In many parts of the East, it is quite otherwise. Without fear of coughs or catarrhs, without shivering, without greatcoat, without umbrella, you may sit on rock or fallen tree, or recline at full length on the brown sward, listening to the cicada or the nightingale, while the sweet soft breeze, redolent of a thousand flowers, fans your cheek. Probably, traditions of the past enter largely into your feelings, and steep your fancy in poetry, which may account for the rapt delight inspired by listening even to the twittering of a sparrow amid the ruins of Chilminar, Palmyra, or Karnak. Here, in the highest temple ever reared by mortal hands, you may meditate or dream for many hours in the morning, undisturbed by a single footstep, till you fancy yourself alone with the past, and call up before you generations coeval with Menes. There is in Egypt a white eagle, not, properly speaking, an inhabitant, but a visitor from the interior, far beyond the sources of the Nile. This bird, as you sit on a fallen shaft, often perches himself on the summit of the ruin, and appears to be watching you as intently as you watch him. His whole frame is motionless except the eyes, which roll incessantly in their sockets, and assume at times a fierce expression, as if he meant to fly at your throat. Suddenly, however, his attention is called away by some sound in-audible to you, and off he flies towards the river. If you rise and watch him, you may behold his form disappear among the waters, and soon afterwards emerge again with prey in the beak. He is a fishing eagle, and lives on the mute dwellers in the Nile.

In the distant island of Crete, your eye and your ear are at once delighted by the form and notes of the blue thrush, the rarest bird in the Mediterranean. As you sit and listen on the southern slopes of Olympus, you behold the brilliant songster, seated, perhaps, on the waving bough of some golden willow, its little breast palpitating with music, invoking passionately the coming night—for the thrush never sings so sweetly as at evening's close, so that its latest song is often mistaken for that of the nightingale. Amid the deep gorges of the white mountains, which send their bases sheer out into the sea, you may often hear from the deck the lays of the thrush, which are scarcely terminated ere they are taken up by those of Philomela, so that for a while you almost forget the transition. Soon, however, your ear, if endowed with sensibility, detects the superiority of the queen of night as in throbs and gushes, she commemorates the causes of her sorrow. In those latitudes, all nature seems to be but one instrument of music—everything is in harmony—the calm, deep-blue sky, the rocks, the wood-clad mountains, the streams, the ripple of the waves among white pebbles upon the beach. Suddenly, a sharp, shrill cry is heard far up between the crags—it is the scream of the night-hawk, as it darts upon some prey gliding timidly through the darkness.

The true region of birds, however, is farther east, where Garganus overlooks the plains, where the Mæander winds, where Ephesus and Miletus in ruins, speak of Hellenic civilisation, where the Carduchian shepherd drives his flocks, where the Turk, calm and quiet, mutters: "La illah, ill ullah!" to himself at midnight, or smokes his refreshing pipe, amid the splendours of the dawn.

> Stern winter smiles on that auspicious clime;
> The fields are florid with unfading prime!

Even in December, marigolds and anemones spring from the turf beneath the olive-trees, myrtles are in full blossom, and in the groves the orange-trees display their golden fruit amid the dark-green foliage. Little more than a month later, the almond trees are in flower; hyacinths and daffodils are profuse in the meadows; while the bees in every copse and thicket hum busily at their work. It is then extremely pleasant to sit at midnight on the housetop, and listen to such sounds as greet the ear at such an hour. Among these, one of the most extraordinary is the noise made by the cranes, which, high up in the air, call to each other, apparently that they may not miss their way in the dazzling moonlight. The imagination of the Arabs created a race of beings analogous to humanity, who could share the pleasures of the cranes by flying through the air, and gazing upon the beauty which earth displays in her sleep. This, in fact, was only attributing sense, reason, and the power of observation, to storks, cranes, and other night-wanderers, which must, they imagined, enjoy extreme delight while passing over deserts, broad rivers, lofty mountains, large cities, towers, towns, villages, and hamlets bathed in moonlight, or touched by the mystic glimmer of the stars. A favourite bird with the Muslims is the curlew, to which they attribute a knowledge of religious truth, affirming that, in its solitary flight, it pronounces incessantly one of the orthodox professions of faith: "Lak, lak, lak! la Kharya Kalak fih il mulk"—God alone is king of the world, without second or companion. In the Great Desert, the traveller is often startled by this religious exclamation of the curlew, uttered in a sharp, shrill tone as he wings his way through the air. The belief is common in the East that all birds have a language, which, through incessant study, may be learned by man; and it is certain that these aërial creatures understand each other as well as we do. Upon superficial observation, their notes appear to be few, so that we arrive at the conclusion, that their ideas are so likewise; but this need not be the case, since every inflection of the voice with them, as with us, may convey different shades of meaning, so that their language may be far more copious than appears at first sight. Of course, they have made considerable proficiency in botany, natural history, and meteorology, since they would otherwise be unable to discern, as they do at a glance, the nature of plants, the character of animals, and the changes of the weather. By this knowledge, they preserve themselves from being poisoned, from attacking animals which they are unable to master, and from remaining longer in one climate than suits their health or their provisions. They are likewise extensively acquainted with geography, so that they can traverse vast tracts of country without ever loosing their way, directing their marches no doubt by observing certain mountains, rivers, or coasts, which, from their elevated points of observation, they discover at a great distance. When we ourselves desire to describe the shortest distance between any two places, we say, "As the crow flies," his flight being regulated with mathematical precision in a right line. Notions like these have led the orientals to indulge in wild speculations on the wisdom of the winged creation, which cannot only comprehend the present, but foretell the future; in which opinion several ancient nations concurred, persuading themselves that they might discover the course of coming events by the flight of birds, and the import of those events by the notes they uttered.—*Chambers's Journal*, Sept. 14, 1867.

BURROWING CRABS.

Perhaps the most remarkable of these is the great Cocoa-nut Eating Crab, or "*Ou-Ou*," as it is called by the natives of some of the localities in which it is met with. It is the *Birgous latro* of naturalists. It is found in the Coral Islands dotting the Indian seas and Pacific ocean, and beneath the rustling, waving, cocoa-nut groves, which abound within the torid zone. The *Ou-Ou* forms for himself a home, delving and burrowing, miner-like, beneath the wide-spreading roots of the tropic trees, and excavating deep and cunningly-formed galleries and chambers in the coral sand and broken shells; and one is almost disposed to think that the following lines by Thomson must have been penned in all the fervour of a poet's admiration for the happy lot of our friend of subterranean proclivities:—

> "Sheltered amid the orchards of the sun,
> Where high palmettos throw their graceful shade,
> Give me to drain the cocoa's milky bowl,
> And from the pine to drain its fresh'ning wine,
> More bounteous far than all the frantic juice
> Which Bacchus pours."

Here, like a feudal baron of old, he forms for himself a stronghold, sallying forth like a freebooter, to feast on the spoils of the grove. Curious stories are related of these marauders, and it has been gravely asserted that they have been known to ascend the tall stalks of the cocoa palms for the purpose of detaching and throwing down the nuts. We are not prepared to say that particular palms (when in a more than ordinarily sloping posture) may not have been climbed in the manner stated by certain species. Our own experience, however, strongly disposes us to think that such nuts as from time to time fall to the ground from ordinary causes, constitute the prizes commonly appropriated by *B. latro*. His enormously powerful and ponderous nippers enable him to husk and rend these from their tenacious coatings with surprising speed and facility; and it is only necessary to examine the cocoa-nut husks with the nuts within them, as imported from abroad, to be convinced that our nut-eating friend must be a veritable crustacean Hercules, to be capable of such feats of strength, as the dragging forth of the treasures from their dense fibrous envelopes unquestionably are; and a Hercules he is in his own way, for the tenacious wire-like network of cocoa fibre in which the nut is inclosed, is torn, split, and rent asunder, as though with the iron pincers of a brawny blacksmith, until the coveted dainty is set free. One end of every cocoa-nut has, as most of our readers are aware, three holes in it; these, from their position and quaint resemblance to a face of a living creature, are called the monkey's face. One of these holes is selected as a point of attack, and a succession of adroitly-delivered and heavy raps are rapidly given with the large claw. An opening, or breach, is thus very quickly effected. The narrow pair of nippers now come into operation, and by dexterously inserting them, the whole of the white, sweet, oleaginous contents are deftly scooped and clawed out. *B. latro* has a keen eye to future wants as well as to present enjoyment; he is not only a gourmand, but pretty much of a utilitarian; so he employs his sharp, powerful claws in carding and combing up the bundles of tangled coir, remaining after his husk-splitting operation. This, by dint of much clawing to and fro, at length becomes almost as fine as tow, or the oakum used by shipwrights. When sufficiently manipulated, he gathers together the result of his labours, and transports it to the inmost recesses of his subterranean stronghold beneath the roots; a bed is here made from it, on which our friend reclines; and it helps to form a convenient covering and protection for him when debarred from the pleasures and delights of Crab society during the uncomfortable process of shell-changing. The crafty human inhabitants of these wave-washed isles, are too well versed in the habits of our friend, and too well aware of his provident habits, not to avail themselves of the stores of well-preserved fibre thus laid up; advantage is therefore taken of the buried store, which is unceremoniously dragged forth, collected together, and made use of for caulking the seams of their canoes, and many other useful purposes. During the period of comparative torpidity usually accompanying the shell-shifting process, the wants of nature are wonderfully and wisely provided for. These strange creatures are each furnished with a species of natural magazine, containing fatty matter, which they carry beneath their tails. Some Crabs of large size have been known to yield enough to produce a quart of oil, limpid, of excellent quality, and highly esteemed by the natives. *B. latro* is much given to nocturnal rambling, and frequent visits are by him paid to localities within the cheering influences of the salt-sea wave; but we do not agree with those writers who have accused him of nightly hydropathic journeys. During the breeding season some considerable time is spent by the whole family in exploring the countless rock-pools and lagunes between the coral reefs. Here after the departure of the parents for their homes amongst the roots, the juvenile crabs continue to desport themselves, until grown strong enough to attack the nuts on their own account, when they proceed to join their seniors in the family diggings. The natives, when they set their minds on a Crab-hunting expedition, provide themselves with much the same kind of equipment as a party of English gamekeepers would use when about to extract a secretive badger from his burrow. Digging, and that of the most determined and energetic description, is the favourite method of bringing the game to light, which desirable consummation is rarely arrived at until a very large amount of loud shouting and needless leaping about has been had recourse to. The unfortunate Crabs are very good to eat, and they appear thoroughly aware of it, making use of every effort in their power to avoid capture. They are, nevertheless, ruthlessly overtaken in the subterranean race, dragged forth into the broad sunlight, ignominiously bound with cords twisted from the tough fibre of the cocoa husk (a very requisite precaution by the bye), and lugged off into hopeless captivity.

Some of these nut-feeders grow to a monstrous size (some being over two feet long), are armed with nippers of most formidable dimensions, and make no more of snapping the strong cord with which the Crab-catchers endeavour to secure them, than if they were as many strands of pack-thread. At certain seasons of the year a vegetable diet appears to become unpalatable to our friend. He then asks a change, and levies open and indiscriminate warfare on all the tribe of shell-bearing molluscs he can lay his thievish claws on, not giving even the ghost of a chance of escape. He seizes them forcibly with his nippers, and then extracts them from their snug shell-castles, with a dexterity which an accomplished London shell-fish dealer might look on with envy; and then, not content with devouring the ill-fated tenant, he performs a sort of grotesque, defiant, and triumphal march, with the vacant shell raised like a standard, aloft in his claws, as if for the express purpose of inciting other Crabs more peaceably disposed and less nefarious in their habits, to the perpetration of outrages of a similar character. Take him for all in all, *B. latro* may be considered anything but a well-conducted member of the family to which he belongs. His name denotes the character which he has fully earned and universally maintains.

The countless thousands of islands, reefs, and spots of newly-formed land dotting the South Seas and Indian Ocean, are ever on the increase. The foundations of these are firmly laid at the sea's bottom by legions of that tiny toiler of the deep, the coral insect, and year by year, and age by age, his ceaseless labours progress upward and ever upward towards the light of heaven; layer by layer, and ledge by ledge, are formed, until the pigmy beginning grows to be a strong sea-wall, like the ramparts of some Old World fortress. In time the green wave breaks and feathers on its crest, whilst other walls slowly but surely raise their masses from beneath. Within their circling grasp, a still rock lake at length is formed, round which the angry billows roll and thunder, chafing at the mighty barrier disputing their dominion. Here, within the safe, still pool, collect the thousand and one waifs and strays, ever to be found floating or driven by the tide currents. Fragments of wreck from distant shores, dead fish, empty mollusc shells, echini, sea-weed, and drift-wood cast far out to sea by the floods of the great rivers of the tropics;—all these, and innumerable other objects, find a resting-place on the newly-formed rocks, and in due time are broken up by decay, but are always added to by the same great store, until, wave-borne in their rough, strong, buoyant husks, come cocoa-nuts and other seeds. These quickly germinate, sprout up, and send their roots far out in search of nutriment, and thus bind the loose materials of the new-formed ground together. Watered by the tropic showers and sea spray, the little sea-girt forest grows apace, and the wandering sea-fowl, and migratory birds are not slow in converting it into a haven of rest for their wearied pinions. These last visitors bring in their crops, from far-off continents and islands, the seeds of many shrubs and plants, which, falling amongst elements congenial to their growth, rapidly spring into life, and, like the trees amongst which they find shelter, bear seed in their turn, and in due season die, to afford food for their successors in the kingdom of plants. Man claims some of these realms as his own; others are left to such inhabitants as nature may people them with. The West India Islands, too, are inhabited by many curious and interesting members of the Crab family: one of these known as the Land Crab (*Gecarcinus turicola*), is pretty much of a highlander in his nature. The upland solitudes are most to his taste, and here he forms for himself a snug retreat beneath the earth of the hill-side. As the spawning season approaches, a mighty gathering of the clans takes place, and whole legions, unwarned by fiery cross or blazing beacon, hasten forth to join the living tide flowing onward towards the sea. Through the tangled jungle, down the rock-strewn ravine, over fallen tree-trunks, and among the dense undergrowth of the forest, in ceaseless, creeping, crawling, scuttling thousands; still they come onward, and ever onward, as the bright stars shine out to light them on their way. Banks, hedges, walls, and even houses are passed straight over in this crustacean steeplechase, no flags being needed to keep the mail-clad competitors to the true course—instinct the guide, and the blue sea for a goal, nothing stops the race.

Cuffee and his companions, who have been gossiping and story-telling beneath their cocoa-leaf roofs until half-asleep, appear to become most violent and incurable lunatics, on suddenly becoming aware of the nocturnal exodus: they leap high in the air, shout, scream, and dance like fiends, whilst the most ready-witted of the crew dash off to *de massa* with the startling news. "Hi, golly, sa; de Crab, de Crab! he come for sure dis time, sure nuff; plenty catch um bum by;" and Cuffee keeps his word to the letter, and captures the pilgrims by the basketful, in spite of their claws; and black-faced, woolly-headed Aunt Lilly, the cook, shows her teeth like ivory dominoes in an ebony box, as visions of white, snow-like rice, cocoa-nut milk, capsicum pods, and stewpans pass in pleasing and appetising review before her, and massa himself takes an extra pull at the cold sangaree jug, sleeps pleasantly, and dreams of the Crab feast of the morrow.

At the termination of the spawning season the survivors return to their homes among the hills; and but little notice is taken of them now, as they night by night bend their weary steps on the backward march, poor, low-conditioned, and unfit for human food, like the salmon-kelt on his journey to the sea. A short residence in his earth burrow serves to set our friend the Crab on his legs again, and make even better food of him than can be prepared during the migration. Sugar-cane plantations are his delight, and in them he regales himself like an alderman, nipping through the crisp rind of the sugar-bearing reed, sucking the luscious juices and clawing out the sweet contents, until a rustling sound warns him that Nemesis, in the form of our old friend Cuffee, is not far off, and that active individual, accompanied by a prick-eared cur, and armed with a spike-pointed cane, pounces down on the very spot where *G. ruricola*, Esq. has been so pleasantly regaling himself, and now commences a fierce and relentless action.

Cuffe, Cur, and Spike, v. Crab. Ever on the alert, Crab darts off backwards with astonishing rapidity, keeping a very bright eye on the cur, who rushes pell-mell after him through the canes, cheered on by the shouts and "Ya, ya's" of his sable master, whose aim it is to head back the Crab, or pin him with his spike. This latter feat he all but accomplishes; but the crab darts like lightning a couple of feet backwards, and then shoots off at right angles with the agility of a sprite. One more rapid dart in the opposite direction, the spike is furiously hurled by baffled Cuffee, and is within an inch of transfixing the cur, who sniffs and whines disconsolately at the mouth of a hole, which leads he knows not whither.

When hunting amongst the grass jungles of the Mahratta country, we were greatly amused at the quaint proceedings of a species of Crab which at certain seasons abounds there. These little fellows, members of the genus *Thelphusa*, were, when we saw them, busily engaged in their hay harvest, and actively engaged in mowing the grass. This they did in the most curiously quaint and elfish manner, sitting bolt upright and working their sharp scissors like nippers right and left, until enough to form a bundle had been gathered; then, with this compactly rolled up in sheafs, off they would trot to their holes, and when the load had been safely disposed of, back they would scuttle for others with quite as much bustle, fuss, and excitement as if they had been the owners of a large estate, a hundred acres of meadow hay to get in, and the barometer at change. So we left our funny, clever, energetic little friends with a good speed, hard at it, making hay whilst the sun shone.

These little fellows, we have every reason to think, are purely inland in their habits, and we know of no instance of their being known to travel either singly or in bodies to the sea coast. A member of the same genera, is found in many parts of the south of Europe, forming burrows for itself in the river banks, and from this habit obtains the name of *Thelphusa fluviatilis.* Few specimens reach three inches in length, and the colour is by no means inviting, being of a dingy yellow. Yet it appears to have attracted much attention amongst the ancients: both Aristotle and Hippocrates knew it well, and there are medals that were struck in very early periods bearing representations of this Crab on them. There appear to be some religious associations connected with crustaceans of this description, as we find the monks of the Greek church taking some pains to procure them, and then disposing of the dainty without troubling the cook. In Italy the burrowing Crabs are eaten at Easter, much as we eat hot-cross buns on Good Friday. There are other Crabs which form burrows both in the sands of the sea-shore and the banks and plains of the interior. One of these is the *Sana Crab* (*Ocypoda arenaria*) of naturalists. The wide, open sand-stretches of many tropical countries abound with these remarkable agile little creatures, who excavate holes in the sand close to the borders of the tide. These are the lilliputian pedestrians with whom skylarking midshipmen engage in foot-races along the strand, and meet ignominious defeat in consequence. As autumn approaches, their sea-side retreats are quitted, the inland burrows occupied, and a state of hybernation gone into, until, the winter having passed away and the spring weather come, *Seaward ho!* is the order of the day again.

The *Gelasimus* is in many respects similar in its habits to these fleet-footed gentlemen, but he turns his attention more directly to sapping and mining operations, carrying on his labours in the most cunning and artful manner. Nothing annoys him more than to have prying men or investigating animals, passing their remarks, or taking note of the mouth of his shaft; so he digs away in his deep level, until he has accumulated a goodly quantity of sand and earth, when up he comes stealthily to the opening of his mine, pops out his head, peers sharply and jealously round, and, if the coast appears clear, round he flourishes his claw with all the force and precision of an accomplished round-hand bowler at cricket, and away he casts the proceeds of his excavations, but at the same time taking care that no two clawfuls go in the same direction, less the newly raised sand should betray the secret he is so careful to conceal.

The sands of the reefs and islands of the Eastern seas afford a home for the King Crab (*Limulus*), who, with his odd-looking, shield-shaped body, and long blade-like spike or spear, will be familiar to many of our readers. Some individuals of this species grow to a very large size, and are sought for by the Malays, both on account of the immense number of eggs they sometimes contain, and the natural weapon with which nature has armed them. These lance-shaped spears are often made use of as points for arrows and other warlike implements, mainly because the wounds inflicted with them are more painful and dangerous than those received from instruments of iron or steel. The Malays are by no means an amiable or forgiving race, and take infinitely more pains to poison the blade of the "crease" or serpentine-knife they carry, than to serve a friend or save a life, and we therefore feel far more respect for a Crab who furnishes the point for the arrow, than for the man who fires it. Then there is the *Nut Crab* or *Calappa*, whose queer little legs are so closely tucked away under his odd little shell, that rambling "*Jack Tars*" in search of "*Curios*" not unfrequently gather a few to bring home to their friends, under the idea that when cut and polished they will serve to form elegant brooches and splendid shirt-pins, for the gay promenades of Portsmouth and Plymouth. A dry old salt of a quartermaster, on the Indian station, chanced one day, when on shore for a cruise, to become possessed of a goodly number of these *lucky stones*, as he called them, and by way of securing his treasures placed them in an old silk handkerchief, and stowed them away, with a few dollars and sundry cakes of *cavendish*, in the corner of his chest. It so happened that some piratical ship-mate, not proof against the allurements of *honey dew* and silver, but totally indifferent to natural history, seized his opportunity and spirited off the tobacco and money, but left the *lucky stones* behind. The next day, when our old friend came for his accustomed supply of the weed, he, to his horror, astonishment, and indignation, found the supposed pebbles in active motion, performing foot-races over his best jacket, the handkerchief spread open, and, alas! empty. "Well," exclaimed he, "blow me if this aint too much of the monkey. Why, look ye here, messmates; these here blessed stones have come to life, every man Jack of 'em. *They've chawed all my bacca* and spent every meg of my money; and now I'll heave all the beggars to Davey Jones's locker. Overboard is where I mean to pitch 'em!" and so he did, no doubt to the intense gratification of the falsely accused Crabs.—*Crab, Shrimp, and Lobster Lore*, by W. B. Lord, R.A. Routledge.

ORIGIN OF OCEANIC CURRENTS.

It is generally allowed, and seems to be unquestionably true, that all the currents which agitate the air must be attributed originally to the unequal distribution of the solar heat. The equatorial regions, exposed more directly to the influence of the sun, have a larger amount of warmth communicated to them than that which is received by the Frigid zones, and a portion at least of this warmth is carried by the aerial agencies to the colder regions of the globe. Some of the heat that falls on the intertropical lands passes by radiation into space; but the larger portion of it is communicated by contact to the air which lies above them. The air thus warmed, and consequently rarefied, rises upwards, and flows northward and southward to the poles. In like manner, the air which lies above the intertropical seas receives, from contact with the heated waters, a portion of the heat which they derive from the sun, and warmed and rarefied, this air also ascends and flows toward the colder regions. These aerial currents are modified in their course by various causes which change their direction and their force; but whatever these modifications may be, the ultimate tendency of the currents of heated air is towards the poles, while a counter current of colder air comes to the equator.

As there is nothing to interrupt the currents of air, their influence continues from age to age unchanged. They raise the average temperature of the Arctic and Antarctic circles, but have no particular effect on one locality more than on another.

Those parts of the Torrid zone which are covered with the deep, receive the same amount of solar heat as those that are occupied by the land. Some of the heat which falls on the ocean, like that which falls on the land, is lost by radiation into space. There is also a portion communicated to the air, to which we have already referred ; but the larger portion is expended in warming the water at the surface. The water thus heated becomes expanded, and consequently lighter than that which occupies the depths below, and, like the air which has been heated by contact with the intertropical land, it flows northward and southward to the poles. The Gulf Stream on the coast of America is one of the most striking examples of these currents.

If we look on this heating, and consequent expanding of the water in the Torrid zone as the origin of the currents that flow to the colder parts of the globe, it follows as a necessary inference, that the larger the expanse of water that is exposed to the rays of the sun, the larger will be the current that is produced. And, on the other hand, it is equally evident, that the smaller the extent of water surface that is exposed to the solar heat, the smaller will the current be.

This seemingly self-evident inference has not always, however, been adverted to. Sir C. Lyell, in his " Principles of Geology," says :—

" Some have been induced to infer that there never has been any interruption to the agency of the same uniform laws of change. The same assemblage of general causes, they conceive, may have been sufficient to produce, by their various combinations, the endless variety of effects of which the shell of the earth has preserved the memorials. The greater warmth that seems to have prevailed in some former periods of the world's history, is not to be ascribed to a greater degree of heat in the globe itself, but to a different distribution of land and water. If we were to imagine all the land to be collected together in equatorial latitudes, and a few promontories only to project beyond the thirtieth parallel, the mean heat of the earth's crust would augment. A remarkable uniformity of climate would prevail amid the archipelagoes of the temperate and polar oceans, where the tepid waters of equatorial currents would freely circulate. We might expect in the summer of the great year, plants allied to genera now called tropical. Forms now confined to arctic and temperate regions would almost disappear, coral reefs would be prolonged again beyond the arctic circles, and droves of turtle might again begin to wander through regions now tenanted by the walrus and seal."

To this hypothesis Sir Charles refers with evident satisfaction in his "Antiquity of Man," p. 363.

Unfortunately for this theory, it is manifestly impossible that " the tepid waters of equatorial currents could freely circulate " at a time when the Torrid zone is supposed to have been almost entirely occupied by land. In the circumstances conjectured, a larger amount of heat would be raised from the land and carried by the air, and the average temperature of the earth would undergo no change. But it is manifestly impossible that any equatorial current could flow where there was no equatorial ocean out of which it could come.

While these streams, from the sunnier climes, pursue their course toward the colder regions of the globe, counter currents come back again towards the warmer. The cold, and consequently condensed and heavier water around the pole, flows as naturally towards the equator, as that which is heated flows to the poles. When the ocean is very deep, and no land interferes with the movements of the water, the returning stream will flow underneath the other. When the water is comparatively shallow, it must seek a separate channel. Such a return stream as we now speak of, laden with its floating icebergs, comes from the Arctic Ocean through Davis Straits, and passes the coast of Newfoundland.

If there were no continents, or large islands, to interrupt their flow, the natural course of the equatorial streams would be northward and southward, with a deviation to the east, in consequence of the earth's revolution on its axis. But in the northern hemisphere at least, the manner in which the land and water are distributed prevents these currents from flowing in this direction. They consequently occupy those channels which the natural configuration of the globe provides.

These channels are not permanent and continuous ; on the contrary, they are liable to great and very remarkable changes. There are evidences, for instance, not to be mistaken, that the State of Massachussetts, and the surrounding parts of the United States of America, had at one time formed the bottom of a stream, which flowed from the north, and carried along with it masses of ice loaded with large pieces of rock. Similar evidences of polar currents are found in Britain, and marks have been discovered on our own hills which show that icebergs had passed over them when they were sunk more than a thousand feet below their present level. By what channels the equatorial waters flowed in those times we cannot tell. These tepid currents carry with them no floating masses, to leave to future ages the traces of their path. We know the course which was pursued by the stream which carried down its treasures of ice to cool the intertropical seas ; but we cannot tell in what direction the other currents flowed.—*Papers offered for Discussion at the Meeting of the British Association at Dundee, By Rev. James Brodie, A.M.*

INSTINCT.

What is the true difference between reason and instinct? The question is one that is far more easily asked than satisfactorily answered, since we perceive that while some have gone the length of reducing all the faculties of the human mind to certain instinctive principles of action, others have elevated the animal instincts to a level with rational deliberation. True reasoning, however, would appear to be that faculty of the mind which distinguishes man from, and elevates him above, the brute creation; it is the peculiar privilege of a free and unfettered agent; the faculty, in short, by which that agent is enabled to discern the difference between good and evil.

Instinct, on the other hand, is the innate or natural impulse implanted in all animals, man not even excepted, in order to insure the well-being and safety of the creature. The faculty of reasoning is dependent upon experience and early training; instinct does not proceed from experience, but is a natural and impulsive feeling implanted by the Creator, as when we shrink from danger, or as when a duckling, a water-tortoise, or a young alligator, emerges from the egg to plunge at once into the water; a natural instinct prompting them to do so, although all are hatched upon the dry land.

"Instinct, therefore," it has been truly said, "differs from intellect or reason, by the unerring certainty of the means it employs, the uniformity of its results, and the perfection of its works prior to, and independent of, all instruction or experience; and lastly by the pursuit of nothing beyond what conduces directly either to the continuation of the individual, or the propagation of the kind."

It would appear, then, that reason is founded upon the experiences of the past, no matter whether they are the experiences of the individual reasoner himself, or of others who may have preceded him. And thus is it that children below a certain age are incapable of reasoning, because they possess no experiences of their own as data, nor can they make use of the experiences of others, since to do so must necessarily require some previous training, which would, in fact, amount to experience.

And yet with all our boasted learning and intellectual powers, it is nevertheless a fact that while our reasoning often leads to false conclusions, the instinct of the animal when left to nature, never errs. Why is this? Man may be tempted by the beauty of certain berries to eat thereof and poison himself from not knowing their deadly properties, whereas a monkey or a bird would turn away with the innate assurance that such fruit was noxious! If then our reasonings are thus *fallible*, and animal instincts are *infallible*, it would at first sight appear as if reason were inferior to instinct; yet such is not the case, nor can there be any real comparison between them, because a little reflection must convince us that while reasoning is *a cause*, instinct is, on the other hand, to be regarded as a *mere effect*; or perhaps, it would be more correct to say, that instinct is the means by which the reasoning of another is made, through animal agency, to produce beneficial results. Man's actions, for instance, are, or rather ought to be, the result or effect of his own sound reasoning; the actions of an animal are the instinctive, or mechanical effects of sound reasoning in another. The animal is, consequently, only the machine or instrument, by which the result of sound reasoning is rendered manifest; it gives effect to reasoning, but the cause of its actions does not dwell in, or proceed from it. If I break a pane of glass with my walking-stick, the fracture is no doubt a result produced through the agency of the instrument employed, but the cause of action is centred, not in the stick, but *in my will*. Thus too is it with animal instinct; the animal performs an act at the impelling instigation of another, whose will it cannot resist; and thus man's reasoning is fallible, because it proceeds from a finite and human source, while instinct is infallible because it proceeds from a perfect and Divine source; which is, in other words, to say that an animal performs, or obeys, the benevolent and good-exacting will, of its Creator who reasons for it.

Having thus, somewhat imperfectly perhaps, explained the difference between *reasoning* and *instinct*; namely, that the former is the direct cause of actions springing from the deliberation, experiences, and will of a free agent, while the latter, through the instrumentality of secondary agencies carries into effect or produces the desired results of the reasonings of another, I shall now proceed to notice some of those wonderful and instructive instances of animal instinct which are so well calculated to prove, not only the correctness of the above definition, but likewise the direct and ever watchful agency of a superintending and controlling intelligence that cannot err.

In the southern parts of Afghanistan it is evident that the chief cause of the great sterility that there prevails, arises from the want of permanent supplies of water; and this deficiency is in turn to be attributed to the lowness of the mountain ranges, the elevation being insufficient to insure, as in the loftier regions of the Himalaya, a permanent supply of water from the gradual melting of the snows. The consequence is that when the warmth of the spring sets in, the snow all rapidly melts away, filling the river channels for two or three months nearly to over-flowing, but leaving them dry for the rest of the year. The residents in those parts of the country, profiting by experience, have adopted the practice of damming up the river beds at no great distance from the hills for the purpose, when the rush of water begins to decrease, of securing and retaining a supply for the irrigation of their crops throughout the summer. By this means a long deep lake is often formed. Man's reason has, in this instance, enabled him to profit by the experience of the past, and has taught him to supply his wants by preventing the escape of the water.

Very similar to the results of this act of reasoning on the part of man, are the ends obtained by the instinct of the beaver (*Castor fiber*) ; indeed, so close is the resemblance that we cannot but acknowledge that the effects in either case have proceeded from the free exercise of reason in the ultimate causes from which they have severally sprung.

It is said by those who have narrowly observed them in their native haunts, that the beavers prefer a creek, or river, on account of the advantages they then derive from the current in floating down timber and other materials to the spot selected for their habitation. It sometimes happens that these creeks, and even the smaller rivers, are liable to have their waters drained off during the winter, when the supply from their sources is temporarily cut off, or frozen up by the severity of the frosts. In order to provide against such a ruinous contingency, the animals, with an instinctive wisdom that nothing short of Omnipotence could impart, proceed to construct a dam across the river at some distance below their houses, by which arrangement a body of water is effectually secured. "These beavers' dams," says Herne, "differ in shape according to the nature of the place in which they are built. If the water in the river, or creek, have but little motion, the dam is almost straight ; but when the current is more rapid it is always made with considerable curve, convex towards the stream." Herein, then, are at once most conspicuously displayed both reasoning, foresight, and design—the two first in selecting the current as a means of transport, and the latter in constructing a dam for the express purpose of preventing the escape of the water and providing the most suitable form for supplying the strength necessary to resist the current's force. What indeed is more indicative of wisdom and calculation than the form of the dam ? Is it not precisely that which of all others man himself would oppose to the current of a stream as being the strongest, and therefore the best adapted to resist the weight and pressure of the water ? Man, however, although the most intelligent of created beings, has only ascertained this fact after years of close study and experience, while the very first beaver at once resorted to this method as the most effectual one it could adopt. How did it know, how could it know that winter would ensue ? How did it learn that the frost would cut off the supply of water from the sources of the stream and so destroy its habitation ? It could know nothing of such things itself, and yet it acted as if it had acquired a perfect knowledge of nature's laws ; and why ? The answer is obvious, the conclusion, unavoidable, because it was taught of God !

The beaver, then, is compelled to act instinctively, or in obedience to a law of nature, which constrains it to provide for its own safety ; and the law thus compelling and controlling its actions is nothing less than the will of God.

Again, there are some species of moths, belonging to the family of the *Bombycidæ*, or silk-spinners, which construct a strong silken cocoon in which the chrysalis, or *pupa*, is destined to pass the winter months ; and these not only show that their actions are neither dictated by caprice nor chance, but they actually appear, on the contrary, to evince great powers of reasoning.—Capt. Thos. Hutton, F.G.S., in *Land and Water*, Sep. 7th.

THE DATE PALM.

THE Date Palm (Phœnix dactylifera) is one of the most important of Palms, and if not an article of very great consumption with us, to some nations it affords their chief support. It is difficult to tell why this fruit is not more largely consumed in this country than it is, for it is not only very delicious, but is likewise very nourishing.

The cultivation of the Date Palm extends through Southern Europe and Western Asia, but more especially in Northern Africa, where the tree is a most invaluable one to the desert tribes. In the South of Europe, where it has been introduced, it seldom or never ripens its fruit in perfection. The cultivation of the Date can be traced to a very remote age, and it seems tolerably certain that where the Palm tree is mentioned in Scripture the Date is implied ; and from this belief the custom in Roman Catholic countries of carrying branches of the Date Palm on Palm Sunday, and on some other festivals of the Church, has had its origin. In places where the Palm will not ripen its fruits it is largely cultivated solely on account of its leaves, which constitute a regular article of trade. In some parts of the Continent, however, where Palm leaves are not to be had, leaves of Cycads are used in churches instead, these plants being largely grown for that purpose—a better substitute, our readers will say, for a true Palm leaf than the Willow, which in many parts of this country is called "Palm." Besides being a valued symbol amongst Christians of ancient and modern times, the Jews also carried Palm branches in their festivals commemorating the possession of the Promised Land. The Palm tree was a type of Judæa, and as such was represented on the coins of Vespasian and Titus. Valuable, however, as Palm leaves may still be in an ecclesiastical point of view, by far the most important production of the Date Palm is its fruit, which is the chief support of the settled tribes of North Africa, as well as the staple product of many other districts. In the Turkish portion of the district of Bussorah the yearly produce amounts to about 33,000 tons, half of which is consumed in the district, and the other half exported to the Persian Gulf ports, India and England. Nor are Dates consumed by the natives alone in those countries in which they are plentiful. Camels, horses, and other animals are said to be exceedingly fond of them.

Three or four varieties of Dates are known in British commerce. Of these Tafilat is always considered ths finest. In their native countries, however, there is scarcely any limit to the kinds known, and their names are derived from their size, shape, quality, &c. These varieties vary considerably in the prices they fetch. In the valleys of the Hedjaz it is said that more than 100 kinds are grown. So large is the value of the Date crops to the different tribes, that the gathering is looked forward to with as much interest as the vintage in the South of Europe, or our own Wheat harvest in England. If the crop fails or is destroyed by locusts, as it sometimes is, a general gloom prevails throughout the entire district. The cultivation of the Date, though so general, is nevertheless an operation requiring some care, as, the plants being diœcious, the female flowers have to be artificially impregnated with the pollen of the male flowers ; for this purpose the male flowers are first gathered, and then men climb the female tree and scatter the pollen over the female flowers. About four or five months after this operation the fruits begin to grow, and when they have nearly attained to maturity they are carefully tied up to prevent them from falling, or from injury by the wind. This process of fertilisation appears to have been well known to the ancients, it is mentioned both by Theophrastus and Pliny. In "Delile's Egyptian Flora" a circumstance is related which occurred in the year 1800, when the Date trees in the neighbourhood of Cairo yielded no crop. It would seem that, the land being completely run over by French and Turkish soldiers, a serious check was given to all branches of husbandry and agriculture. The Date Palms flowered, but the artificial fertilisation was omitted, and the result was that no fruit was produced, the pollen of the male flowers, though scattered by the winds, did not reach the female flowers in sufficient quantities to ensure fertilisation.

Dates, as we see them in this country, are the fruits that have been gathered and dried in the sun before becoming quite ripe ; for if they are allowed to hang upon the trees till fully ripe they are unfit for keeping, as they soon turn acid or ferment. The Arabs make a kind of Date cake by pressing the fruits in baskets, and this forms their principal subsistence at such times when fresh Dates are not to be obtained ; similar cakes are made and cut into slices and sold to travellers by the monks of Mount Sinai. When Dates are fully ripe they contain a large quantity of thick syrup, which the natives express and collect to preserve the Dates themselves and other fruits in ; a strong spirit is also distilled from them. Besides these varied uses of the fruits, the trunk, leaves, and indeed the entire plant is valuable for various economic purposes. Baskets, crates, walking-sticks, and a multitude of other articles are made from the petiole. Cordage, and a kind of coarse cloth is made from the sheathing bases of the leaf-stalks, and from the trunks themselves are hewn posts, beams, &c., indeed the huts of the natives are almost entirely composed of parts of this Palm, and even the hard stones or seeds are boiled or ground as food for cattle. Date Palms are not unfrequently objects of exchange or barter, a single tree being often given over from one person to another in payment of a debt. A bridegroom also pays the price of his bride in Date trees to her father. The trees, which grow to a height of 60 or 80 feet live to a good old age ; 100 to 200 years is not at all uncommon, and they bear fruit abundantly all that time. The consumption of Dates in this country is, as we have said, very small, the yearly imports upon an average perhaps do not exceed 14 or 15 tons.

Whether the Wild Date (Phœnix sylvestris), which grows abundantly all over India, is a distinct species, is a question on which botanists have disputed. Unlike the cultivated Date its value does not depend on its fruits, but on the quantities of Palm wine, or toddy, and the amount of sagar which are obtained from it. In India large quantities of both are made, and the average yield of a single tree is said to be from 120 to 240 pounds of juice.—J., *Gardener's Chronicle*, Sep. 14th.

THE MOCKING-BIRD OF AMERICA—*MIMUS POLYGLOTTUS.*

THE precise time at which the Mocking-bird begins to build his nest varies according to the latitude in which he resides. In the lower parts of Georgia he commences building early in April, but in Pennsylvania rarely before the 10th of May, and in New York and the States of New England still later. There are particular situations to which he gives the preference. A solitary thorn bush, an almost impenetrable thicket, an orange tree, cedar, or holly bush, are favourite spots, and frequently selected. It is no great objection with him that these happen sometimes to be near the farm or mansion house. Always ready to defend, but never over anxious to conceal his nest, he very often builds within a small distance of the house, and not unfrequently in a pear or apple tree—rarely at a greater height than six or seven feet from the ground. The nest varies a little in different individuals, according to the conveniency of collecting suitable materials. First, a quantity of dry twigs and sticks; then, withered tops of weeds of the preceding year, intermixed with fine straws, hay, pieces of wool, and tow; and lastly, a thick layer of fine fibrous roots of a light-brown colour lines the whole. The eggs are four, sometimes five, of a cenereous-blue, marked with large blotches of brown. The female sits fourteen days, and generally produces two broods in the season, unless robbed of her eggs, in which case she will even build and lay the third time. She is, however, extremely jealous of her nest, and very apt to forsake it if much disturbed. During the period of incubation neither cat, dog, animal, nor man can approach the nest without being attacked. The cats in particular are persecuted whenever they make their appearance, till obliged to retreat. But his whole vengeance is most particularly directed against that mortal enemy of his eggs and young—the black snake. Whenever the insidious approaches of this reptile are discovered, the male darts upon it with the rapidity of an arrow, dexterously eluding its bite, and striking it violently and incessantly about the head, where it is very vulnerable. The snake soon becomes sensible of its danger, and seeks to escape; but the intrepid defender of his young redoubles his exertions, and, unless his antagonist be of great magnitude, often succeeds in destroying him. All its pretended powers of fascination avails it nothing against the vengeance of this noble bird. As the snake's strength begins to flag, the Mocking-bird seizes and lifts it up partly from the ground, beating it with his wings; and, when the business is completed, he returns to the repository of his young, mounts the summit of the bush, and pours out a torrent of song in token of victory.

The plumage of the Mocking-bird, though none of the homeliest, has nothing gaudy or brilliant in it, and, had he nothing else to recommend him, would scarcely entitle him to notice; but his figure is well proportioned, and even handsome. The ease, elegance, and rapidity of his movements, the animation of his eye, and the intelligence he displays in listening and laying up lessons from almost every species of the feathered creation within his hearing, are really surprising, and mark the peculiarity of his genius. To these qualities we may add that of a voice full, strong, and musical, and capable of almost every modulation, from the clear, mellow tones of the woodthrush to the savage scream of the bald eagle. In measure and accent he faithfully follows his originals; in force and sweetness of expression he greatly improves upon them. In his native groves, mounted on the top of a tall bush or half-grown tree, in the dawn of dewy morning, while the woods are already vocal with a multitude of warblers, his admirable song rises pre-eminent over every competition. The ear can listen to his music alone, to which that of all the others seems a mere accompaniment. Neither is this strain altogether imitative. His own native notes, which are easily distinguishable by such as are well acquainted with those of our various song birds, are bold and full, and varied seemingly beyond all limits. They consist of short expressions of two, three, or at the most five or six syllables, generally interspersed with imitations, and all of them uttered with great emphasis and rapidity, and continued with undiminished ardour for half an hour or an hour at a time. His expanded wings and tail, glistening with white, and the buoyant gaiety of his action arresting the eye, as his song most irresistibly does the ear, he sweeps round with enthusiastic ecstacy; he mounts and descends as his song swells or dies away; and, as my friend Mr. Bartram has beautifully expressed it, "he bounds aloft with the celerity of an arrow, as if to recover or recal his very soul, expired in the last elevated strain." While thus exerting himself a bystander destitute of sight would suppose that the whole feathered tribes had assembled together on a trial of skill, each striving to produce his utmost effect, so perfect are his imitations. He many times deceives the sportsman, and sends him in search of birds that perhaps are not within miles of him, but whose notes he exactly imitates; even birds themselves are frequently imposed on by his admirable mimics, and are decoyed by the fancied calls of their mates, or dive with precipitation into the depth of thickness at the scream of what they suppose to be the sparrowhawk.

The Mocking-bird loses little of the power and energy of his song by confinement. In his domesticated state, when he commences his career of song it is impossible to stand by uninterested. He whistles for the dog—Cæsar starts up, wags his tail, and runs to meet his master. He squeaks out like a hurt chicken, and the hen hurries about with hanging wings and bristled feathers, clucking to protect its injured brood. The barking of the dog, the mewing of the cat, the creaking of a passing wheelbarrow, follow with great truth and rapidity. He repeats the tune taught him by his master, though of considerable length, fully and faithfully. He runs over the quiverings of the canary and the clear whistlings of the Virginia nightingale or red-bird with such superior execution and effect, that the mortified songsters feel their own inferiority and become altogether silent, while he seems to triumph in their defeat by redoubling his exertions.

"This excessive fondness for variety, however, in the opinion of some injures his song. His elevated imitations of the brown thrush are frequently interrupted by the crowing of cocks; and the warbling of the blue-bird, which he exquisitely manages, are mingled with the screaming of swallows, or the cackling of hens; amidst the simple melody of the robin we are suddenly surprised by the shrill recitations of the whip-poor-will, while the notes of the killdeer, blue jay, martin, baltimore, and twenty others, succeeding with such imposing reality that we look round for the originals, and discover with astonishment that the sole performer in this singular concert is the admirable bird now before us. During this exhibition of his powers he spreads his wings, expands his tail, and throws himself around the cage in all the ecstacy of enthusiasm, seeming not only to sing, but to dance, keeping time to the measure of his own music. Both in his native and domesticated state, during the solemn stillness of night, as soon as the moon rises in silent majesty, he begins his delightful solo, and serenades us the livelong night with a full display of his vocal powers, making the whole neighbourhood ring with his inimitable medley." — *Ednore and Samuels' Ornithology and Oology of New England.* London: Trubner.

PROTECTION IN NATURE.

THE slightest observation of the life of animals will show us, that they escape from their enemies and obtain their food in an infinite variety of ways; and that their varied habits and instincts are in every case adapted to the conditions of their existence. The porcupine and the hedgehog have a defensive armour that saves them from the attacks of most animals. The tortoise is not injured by the conspicuous colours of his shell, because that shell is in most cases an effectual protection to him. The skunks of North America find safety in their power of emitting an unbearably offensive odour; the beaver in its aquatic habits and solidly constructed abode. In some cases the chief danger to an animal occurs at one particular period of its existence, and if that is guarded against its numbers can easily be maintained. This is the case with many birds, the eggs and young of which are especially obnoxious to danger, and we find accordingly a variety of curious contrivances to protect them. We have nests carefully concealed, hung from the slender extremities of grass or boughs over water, or placed in the hollow of a tree with a very small opening. When these precautions are successful, so many more individuals will be reared than can possibly find food during the least favourable seasons, that there will always be a number of weakly and inexperienced young birds who will fall a prey to the enemies of the race, and thus render necessary for the stronger and healthier individuals no other safeguard than their strength and activity. The instincts most favourable to the production and rearing of offspring will in these cases be most important, and the survival of the fittest will act so as to keep up and advance those instincts, while other causes which tend to modify colour and marking may continue their action almost unchecked.

It is perhaps in insects that we may best study the varied means by which animals are defended, or concealed. One of the uses of the phosphorescence with which many insects are furnished, is probably to frighten away their enemies; for Kirby and Spence state that a ground beetle (Carabus) has been observed running round and round a luminous centipede as if afraid to attack it. An immense number of insects have stings, and some stingless ants of the genus Polyrachis are armed with strong and sharp spines on the back, which must render them unpalatable to many of the smaller insectivorous birds. Many beetles of the family Curculionidæ have the wing cases and other external parts so excessively hard, that they cannot be pinned without first drilling a hole to receive the pin, and it is probable that all such find a protection in this excessive hardness. Great numbers of insects hide themselves among the petals of flowers, or in the cracks of barks and timber; and finally, extensive groups and even whole orders have a more or less powerful and disgusting smell and taste, which they either possess permanently, or can emit at pleasure. The attitudes of some insects may also protect them, as the habit of turning up the tail by the harmless rove-beetles (Staphylinidæ) no doubt leads other animals besides children to the belief that they can sting. The curious attitude assumed by sphinx caterpillars is probably a safeguard, as well as the blood-red tentacles which can suddenly be thrown out from the neck, by the caterpillars of all the true swallow-tailed butterflies.

It is among the groups that possess some of these varied kinds of protection in a high degree, that we find the greatest amount of conspicuous colour, or at least the most complete absence of protective imitation. The stinging Hymenoptera, wasps, bees, and hornets, are, as a rule, very showy and brilliant insects, and there is not a single instance recorded in which any one of them is coloured so as to resemble a vegetable or inanimate substance. The Chrysididæ, or golden wasps, which do not sting, possess as a substitute the power of rolling themselves up into a ball, which is almost as hard and polished as if really made of metal,—and they are all adorned with the most gorgeous colours. The whole order Hemiptera (comprising the bugs) emit a powerful odour, and they present a very large proportion of gay-coloured and conspicuous insects. The lady-birds (Coccinellidæ) and their allies, the Eumorphidæ, are often brightly spotted, as if to attract attention ; but they can both emit fluids of a very disagreeable nature ; they are certainly rejected by some birds, and are probably never eaten by any.

The great family of ground beetles (Carabidæ) almost all possess a disagreeable and some a very pungent smell, and a few called bombardier beetles have the peculiar faculty of emitting a jet of very volatile liquid which appears like a puff of smoke, and is accompanied by a distant crepitating explosion. It is probably because these insects are mostly nocturnal and predacious that they do not present more vivid hues. They are chiefly remarkable for brilliant metallic tints or dull red patches when they are not wholly black, and are therefore very conspicuous by day, when insect-eaters are kept off by their bad odour and taste, but are sufficiently invisible at night when it is of importance that their prey should not become aware of their proximity.

It seems probable that in some cases that which would appear at first sight to be a source of danger to its possessor may really be a means of protection. Many showy and weak-flying butterflies have a very broad expanse of wing, as in the brilliant blue Morphos of Brazilian forests, and the large Eastern Papilios ; yet these groups are tolerably plentiful. Now, specimens of these butterflies are often captured with pierced and broken wings, as if they had been seized by birds from whom they had escaped ; but if the wings had been much smaller in proportion to the body, it seems probable that the insect would be more frequently struck or pierced in a vital part, and thus the increased expanse of the wings may have been indirectly beneficial.

In other cases the capacity of increase in a species is so great that however many of the perfect insect may be destroyed, there is always ample means for the continuance of the race. Many of the flesh-flies, gnats, ants, palm-tree weevils and locusts are in this category. The whole family of Cetoniadæ or rose chafers, so full of gaily-coloured species, are probably saved from attack by a combination of characters. They fly very rapidly with a zigzag or waving course ; they hide themselves the moment they alight, either in the corolla of flowers or in rotten wood or in cracks and hollows of trees, and they are generally encased in a very hard and polished coat of mail which may render them unsatisfactory food to such birds as would be able to capture them. The causes which lead to the development of colour have been here able to act unchecked, and we see the result in a large variety of the most gorgeously-coloured insects.—*Westminster Review*, July, 1867.

THE HERRING.

It is a pity that we do not know more about the natural history of the herring—indeed more knowledge is greatly wanted of the life and habits of all our sea fish. We literally do not know the alphabet, so to speak, of the natural history of our best food fishes. We can only guess at what age the haddock or the herring becomes reproductive, or how long the spawn takes to quicken into life, yet these are the first points that ought to be determined in all animal economy. It is gratifying to find that some of our best writers on natural history are turning their attention to these very material points in the economy of our fish food supplies. So far as the herring is concerned, it is now pretty well determined that it is an animal that breeds and grows in the British seas, and is never absent from the waters that surround our islands. The old story of its annual migration from the arctic seas, the authorship of which, by-the-bye, has been erroneously ascribed to Pennant, has long since been disproved, and the herring is now known to be a very local animal. That is really so, for it has been often shown that the herrings of one locality differ considerably from those of another: the herrings taken in the Frith of Forth, for instance, can be distinguished by fishery experts from those taken in Lochfyne. The food of these fish varies in different places, and is also less abundant in some places than in others; and we have noticed in consequence that the herrings of the inland Scottish lochs are fatter and of better flavour than the fish taken on the open sea-board. We have long been of opinion also that each particular sea or bay has its own particular season so far as the spawning of the fish is concerned; and moreover, that the herrings are arriving at maturity and spawning all the year round, of course at different places of the coast. Some writers on the natural history of the herring are of opinion that these fish spawn at a very early age, that the spawn comes very quickly to maturity, and that the fish arrive at the reproductive stage with great rapidity. But there is no certain information on these points; most of what has been said or written on that part of the natural history of the herring is founded on guesswork, as is also the supposition of some fishery economists that herrings spawn twice a year. Mr. John Cleghorn of Wick, who has studied the natural history of the herring with great care, is of opinion that these fish exist in races, and that, race by race, they come to maturity in the different months of the year; so that we might obtain plentiful supplies of fresh herrings all the year round. Before leaving this part of our subject we may notice, as among the curiosities of fish life and growth, that some persons think whitebait are the young of the herring in a very early stage of its life, and that there are writers who maintain the sprat to be also the young of the herring. It is certainly curious that sprats (*i.e.* fish with a serrated abdomen) are taken along with the young herring in great quantities. We should be very glad to learn that some experiments had been instituted to find out the exact relationship that the sprat bears to the herring, and also to determine the periods of reproduction of all our food fishes.—*People's Magazine*, September.

New Books.

Our limited space must of necessity compel us to give but very short notices of new books, but they will perhaps serve as a guide as to what books our readers may ask for at their libraries.]

Hog-hunting in the East, and Other Sports. By Captain J. T. Newall, Author of "The Eastern Hunters," "John Neville," &c. London: Tinsley Brothers. 1867.

WE have here one of the most pleasant volumes it has been our lot to read for some time. Captain Newall is a sportsman of the right school, combining instructive descriptions of the various animals, with hair breadth escapes and wild encounters sufficient to gratify most people. The district must be the very thing for Englishmen, to judge from his description. He says:—

> The entire length of the Province of Cutch is 200 miles, and its greatest breadth, exclusive of the Run, forty-five miles. All kinds of hunting countries are to be found in this space; and a sportsman may according to his taste, or the season of the year, ride a pig either on the open plain of the Run or the level in the neighbourhood of the sea coast, or diversify his sport by a gallop over the stony hills or among the rivers, ravines, and nullahs, of the interior.

As the title indicates, hog-hunting formed the chief amusement, though not the only one, as numerous anecdotes and incidents of other sports will be found scattered through its pages, including one or two bear adventures. Our author has no mean eye for the beauties of nature, as may be seen from the following:—

> "I wish I could give you fellows an idea of the glorious scenery of that pass," said Melton. All the lower slopes of the mountains with a southern exposure towards Dhurmsala, were either bare spurs of the most vivid green, varied with the colours of the rocks, or clothed with magnificent forests of oaks and rhododendrons. Those again to the north were clad in the more sombre garments of pine, cedar, and fir. Above the region of the trees, where the widowed mountain rose desolate and grand till it culminated in peaks, precipices, and glaciers, the great seams and clefts of the range were mostly filled with snow, hiding the torrents which somewhat lower broke away and flashed roaring down the mountain. These gorges, however, were but mere intersections of the great upland slopes, which were strewn with huge boulders of granite—the debris from the peaks and precipices above—among which the most beautiful flowers, ferns, lichens, and grapes, in infinite variety, and including many much prized in England, gemmed the rich verdure and mingled with masses of bracken and wild rhubarb, "wasting their sweetness in the desert air."
>
> It is only those who have seen such who can fully appreciate the ruggedness, the desolate, secluded wildness and grandeur of the lone mountain scenery, unstained, uncontaminated by the feeble efforts of man, and showing in its vast and solitary glory the all-powerful impress of the hand of nature in her sternest mood. No sound to break the silence save the dull murmur of some distant cascade, the wild cry of the moonal, some call from the forests below, or the occasional fall of a mass of rock. Such is the great spur of the Himalayas, which separates the Burnaor valley from the Punjaub.

In conclusion, we may say that there are twenty-three illustrations well executed, and of some merit, and that we can confidently recommend the volume to all who are in want of several hours' very pleasant reading.

Mushrooms and Toadstools. By W. G. Smith. Pp. x. and 64; with two large sheets containing figures of Edible and Poisonous Fungi. London: Hardwicke. 1867.

THIS is a very valuable little work, with two sheets of drawings representing the most important edible and poisonous fungi of the British islands. The sheets appear drawn for the purpose of hanging up in schoolrooms and other places, where indeed they will be found of the greatest service, as there are still many we constantly see in the papers who from want of knowledge gather and eat the poisonous kinds.

The Orchard and Fruit Garden. By Elizabeth Watts. London: Warner and Co.

AN excellent little work on fruit-growing; superior to many that have been issued for the purpose of teaching the reader how to procure a good stock of fruit. There are some few faults, but they are of a minor character, and do not in any way detract from the value of the volume; one fault we may mention is giving too many different methods of doing things—though this may possibly be a virtue in the eyes of some who are fond of change and like experimenting.

BOOKS RECENTLY PUBLISHED.

A New Theory of Geology, in which the Truth of the Bible is demonstrated, and Dr. Colenso's Attack refuted, by proving from Facts and Science the Literal Accordance of Geology with the First Chapter of Genesis, and also establishing the Credibility of Noah's Flood, &c. By J. L. Hamilton, Adams and Co.

British Conchology, Vol. IV. Marine Shells in continuation of the Gasteropoda as far as the Bulla family. By John Gwyn Jeffreys, F.R.S. 8vo. Pp. 488, tab. 8, and a coloured frontispiece. Van Voorst. 1867.

The Silkworm Book; or, Silkworms Ancient and Modern, their Food, and Mode of Management. By W. B. Lord, R.A. 8vo. Cox. 1867.

Carolina Sports, by Land and Water; including Incidents of Devil-Fishing, Wild-Cat, Deer and Bear Hunting, &c. By the Hon. William Elliott. Post 8vo. 6s. R. Bentley.

Meetings of Learned Societies.

THE BRITISH ASSOCIATION.

Physical Science.

President, Professor Sir W. Thomson; Vice-Presidents, Prof. Fischer, J. P. Gassiot, Professor Kelland, J. Clerk Maxwell, Rev. C. Pritchard, Prof. Tyndall, Dr. C. Wheatstone; Secretaries, Rev. C. Buckle, Prof. G. C. Foster, Prof. Fuller, Prof. Swan; Committee, Sir E. Belcher, W. R. Birt, Sir D. Brewster, C. Brooke, A. R. Catton, A. Claudet, Dr. Everett, Rev. Dr. J. Forbes, J. Glaisher, Dr. Haan, Rev. R. Harley, A. Herschel, W. P. Hiern, Prof. Hirst, W. H. Hudson, Sir H. James, E. J. Lowe, Prof. Mannheim, C. Meldrum, J. R. Napier, Admiral Ommanney, Prof. Rankine, W. Spottiswoode, Balfour Stewart, Col. Sykes, Prof. Sylvester, G. J. Symons, Dr. F. H. Thomson, Sir A. Scott Waugh, Prof. Williamson.

At the opening of this section on Sept. 5th, the president made a brief verbal address, in which he paid a high tribute to the late Prof. Faraday.

The proceedings then opened with the reading of the report of the Lunar Committee, in which were given the proceedings of the committee, and the results of the investigations of Mr. W. R. Birt in regard to the mapping of the moon, and the changes which were supposed by astronomers to have taken place in the crater Linné. Mr. Glaisher read a paper giving remarks on the original objects and general work of the Lunar Committee. Mr. J. Clerk Maxwell followed with a paper "On a Real Image Stereoscope, with illustrations of Solar Geometry." Mr. Balfour Stewart read a paper "On the behaviour of the Aneroid Barometer at different pressures."

"On Meteorological Observations at Sea," by Mr. F. W. Moffat. This paper was communicated by Dr. Moffatt. For whom the observations were made, for the purpose of ascertaining the quantity of ozone indifferent degrees of latitude and longitude at sea. The observations extend between lat. 53° N. and 39° S., and long. 83° E. and 25° W. Dr. Moffat had observed that as the wind veered with increasing readings of the barometer from south points of the compass through west to north, ozone disappeared and continued absent while the wind was in points between north and east, and that it re-appeared as the wind veered with decreasing readings of the barometer to south points. The disappearance and re-appearance of ozone with these conditions were so regular that the changes appeared to be the result of an invariable atmospheric law, and Dr. Moffat was induced to examine the law of the rotation of the wind, so clearly deveĺoped by Dove, and the results of the examination led him to believe that the polar current is the non-ozoniferous, or that of minimum of ozone, and that the equatorial, or sea-wind, is the ozoniferous, or that of the maximum of ozone. According to the rotation theory, the polar current in the northern hemisphere forms the N.E. "trade," and that in the southern hemisphere forms the S.E. "trade," while the equatorials in the northern and southern hemispheres form the upper or returning "trades." These returning "trades" come to the earth's surface in both hemispheres about the 28th degree (the latitude varies with the season), north and south of the equatorr. Dr. Moffat stated that if his deductions are trustworthy, the N.E. and S.E. "trades" ought to be the minimum of ozone currents, and the returning "trades" the maximum of ozone currents; that in the northern hemisphere forming the S.W. wind, and the other in the southern hemisphere a N.W. wind; and as these currents consisted of the atmospheres of equatorial latitudes, the quantity of ozone ought to be at least as great at the equator as with the returning currents. Dr. Moffat showed by tabulated results that such was the case, and he expressed a belief that were it not for the modifying effects of the trade-winds, ozone would be a constant quantity at sea.

"Experiments on the Luminosity of Phosphorus," by Dr. J. Moffat. Dr. Moffat gave the results of several interesting experiments which he had made on the luminosity of phosphorus. From these experiments, it was shown that phosphorus in a luminous state produced phosphorus and phosphoric acids and ozone, and that it was non-luminous in a degree of temperature below 39° Fahr., and that it was luminous in a temperature above 45° Fahr. The temperature of luminosity and non-luminosity, however, Dr. Moffat, stated, varied with the pressure of the atmosphere, and also with the direction of the wind. When phosphorus was kept in water, and air in a non-luminous state, the water and air became phosphorated, and they became phosphorescent, on their temperature being increased, and ozone was formed during their phosphorescence. Water reduced to the freezing point also became phosphorated, and it became phosphorescent on being heated. Phosphorus in a non-luminous state did not produce ozone; phosphorated air and water were not ozonized, but they were ozonised when phosphorescent. The author observed that steel needles suspended in phosphorus vapour assumed magnetic properties, and that a stream of vapour arising from phosphorus was attracted by heat and repelled by cold. From results deduced from a series of experiments made upon luminosity of phosphorus in connexion with atmospheric conditions, and extending over a period of four years, it would appear, the author said, that the equatorial or sea-wind is that of phosphorescence and ozone, and that the polar or land-wind is that of non-luminosity and no ozone. From these results, Dr. Moffat is induced to ask, is it not probable, as the sea is the reservoir of ozone, that ocean phosphorescence is the chief source of its development?

On September 6th, Mr. Glaisher was called upon by Sir William Thomson for his report on "Luminous Meteors." The walls of the section-room were hung with several finely-coloured diagrams illustrative of the flights of meteors, and Mr. Glaisher said that the object of the committee was to ascertain more particularly the nature of meteoric flights. Last year there were a vast number of observations. The Committee had arranged for an extensive series of observations of the November meteors, which were very successfully carried out. A large number of meteors had been seen at Greenwich—about 9,000—but these were not included in the present catalogue. One large meteor was observed at Cardiff, and the luminosity remained visible for about 18 minutes. One was also seen above Dundee of extraordinary brilliance, which was ascertained to be about 51 to 57 miles above the earth. A curious detonating fire-ball was then described. This body was seen in broad day-light in France in the month of June last, and was of a very extraordinary character. Another was seen at Glasgow, which passed nearly over St. Andrew's, where it appeared to consist of three parts, each equal to Venus, and it was calculated that this meteor passed at a distance of about 50 miles above the earth. At Aberdeen a brilliant fire-ball was first seen last November, which, it was afterwards found, was seen also over the whole of Scotland, and as far as Nottingham. A remarkable fire-ball, seen near Basle—of which there was a coloured diagram on the wall—had been observed in the Observatory at Basle and also in Paris. A large amount of information was given regarding the reports received from various localities where the meteoric showers of last November were seen—the Cape of Good Hope and other places.

Professor Herschel made a few remarks on the character and quality of the meteoric light. He said that the spectroscope showed a yellow light, but of what this light was composed it was impossible to say. As observers multiplied, however, with telescopes armed with spectroscopes, this difficulty would no doubt be resolved. The connexion between comets and meteors had this year been established without doubt, and that connection gave wide scope for speculation as to the origin and character of meteoric bodies. Mr. Huggins had made an observation of the light of a comet, and although that observation was not perfect, still it was sufficient to identify the light of the nucleus of the comet with that of the meteoric bodies. There were two theories as to these meteors. Leverrier had shown that their orbit extended from that of Uranus to that of the Earth, while an Italian astronomer believed that they came from the utmost fields of space. Fifty-six showers were well established, and it was by the study of these showers that they hoped to continue, and possibly confirm and extend, their researches by the assistance of those zealous observers who had hitherto been their supporters and constant assistants among the members and other observers of this Association.

September 9th.—Mr. Symons read the report of the Rainfall Committee, after which Mr. Glashier, for Mr. Alexander Brown, Arbroath, read a paper giving observations as to the rainfall in that district.

Colonel Sykes, M.P., read a paper on "Storm warnings—their importance and practicability." He calculated that out of 405 warnings given under the system lately in use, the prognostications were correct in 305 cases. Colonel Sykes next read a series of petitions which had been sent praying for the resumption of the storm signals. In speaking of the practicability of working the signals, he said that storms generally came from the westward, and that notice of the advent of these storms could be telegraphed from the west of Ireland to England several hours before the wind actually reached those parts. Indeed, he had been informed by one of the most eminent electricians that as storms generally travelled across the Atlantic to this country they might have a week's warning of them before they reached Britain, by means of the Atlantic cable.

September 10th was taken up with the Pascal and Newton controversy.

September 11th.—The Secretary read a paper from Mr. C. Wheatstone, "On a new Telegraphic Thermometer, and on the Application of the Principle to other Meteorological Indicators." He exhibited the instrument and explained its construction; and concluded by stating the purposes to which it might be applied. If it was desired to ascertain the temperature on the top of Mont Blanc, a portion of the apparatus called the responder might be placed there, and a communication having been established between it and the questioner, observations of the temperature of the mountain might be made hourly in the Vale of Chamouni. Again, the responder might be placed in the bottom of the sea, or at any depth beneath the surface of the earth, and the most accurate observations could be obtained without removing the instrument.

Sir A. Waugh read a paper giving details with regard to the preparations now being made, under the auspices of the Secretary of State for India, for observing the total solar eclipse of August 18, 1868.

A paper was read from R. Russell, "On some deductions by Dr. Tyndall, from his recent experiments regarding the radiant and absorptive properties in the atmosphere."

Geology.

President, Archibald Geikie; Vice-Presidents, The Earl of Enniskillen, Sir P. Egerton, Professor Harkness, Prof. Nicol, Dr. T. Oldham, Professor Ramsay; Secretaries, E. Hull, W. Pengelly, H. Woodward; Committee, Prof. D. T. Ansted, Hilary

Bauerman, Dr. J. Bryce, W. Carruthers, E. W. Cooke, Rev. J. Crompton, Rev. H. W. Crosskey, Dr. D. Dalrymple, Dr. C. Le Neve Foster, Sir Duncan Gibb, J. Gwyn Jeffreys, Col. Sir H. James, Sir C. Lyell, R. Lightbody, Sir J. Lubbock, G. Maw, W. S. Mitchell, Sir R. I. Murchison, G. A. Morton, R. W. Mylne, Dr. H. A. Nicholson, S. R. Pattison, C. W. Peach, J. Powrie, C. B. Rose, S. Sharp, Rev. H. B. Tristram, W. H. S. Westropp, Rev. H. H. Winwood, E. A. Wunsuch, J. Wyatt, E. Wood, Major Woodall.

The business of Section C (Geology) was opened by Mr. Geikie, the president, giving an address on the igneous rocks and the traces of volcanic action in the British Islands. He began by noticing the igneous rocks in the Lower Silurian system, which had been illustrated by Sir Roderick Murchison, Professor Ramsay, and others, and in the Lake district by Professor Sedgwick. In the Lower Silurian in Scotland there had been no great volcanic activity, but in the Upper Silurian it abounded, as was shown in the Ochil and Pentland hills. The volcanic beds in the carboniferous limestone series were frequent, and in the old and new red sandstones. With regard to the basaltic plateau which formed the great feature of the western coast scenery of Scotland, he had at first believed, with Professor Edward Forbes, that it was of the secondary period, but recent examination had now led him to conclude that it belonged to the tertiary. The president noticed the singular persistency of volcanic action from the Lower Silurian upwards, and the various points of difference between the older eruptions and the later. The study of the igneous rocks furnished no proof that volcanic action had been less in the newer than in the older formations. The greatest of these eruptions in Scotland belonged to the Miocene period, which was one of the latest. So far from the activity of volcanic action having decreased, were it now to be resumed, it would be looked upon as but a part of one great system, so near to us geologically were the greatest of the irruptions. Mr. Geikie then spoke of the trap dykes, and concluded by expressing his belief that much remained to be discovered in the field of the igneous rocks.

Professor Phillips complimented Mr. Geikie as one of the greatests geologists in the country of Hutton, Playfair, Jameson, and Maculloch; and he believed that they would receive from his hands some of the best contributions touching the problems which he advanced in his address.

A paper, by Dr. Robert Chambers, was read, giving an account of an "eskar" at St. Fort, near Newport, Fife; and Mr. Milne Holme read a paper on the old sea-cliffs and sub-marine banks of the Firth of Forth. Dr. J. Bryce gave an account of recent researches into the age of the Arran granites. Professor Harkness read a paper by Dr. M. A. Nicholson and himself, "On the Coniston group of the Lake District," which was followed by two papers by Dr. Nicholson, and read by him, the first being "On the Graptolites of the Skiddaw Slates," and the second "On the Nature and Systematic Position of the Graptolitidæ." Professor Phillips, Sir Philip Egerton, and Mr. Carruthers made a few observations on these papers.

The Secretary read a preliminary report, drawn up by Mr. A. H. Scott, of the committee for the exploration of the plant beds of North Greenland, appointed at the Nottingham meeting of the Association. The report stated that Mr. Whymper, having made arrangements to visit Greenland, the Association had voted a grant of £100 to enable him to prosecute this investigation, and that a further grant of £200 had been received from Government. Mr. Whymper started for Copenhagen in April last, taking with him Dr. Robert Brown, and no intelligence of the expedition had been received since it left Copenhagen. The description of the plant remains from North Greenland which had already been brought to these countries had been completed by Professor Oswald Heer, of Zurich, and his work on the flora of the Polar region was now nearly completed, and would be published in a short time.

At the next meeting, Mr. George Maw read a paper on "The Cambrian Rocks of Llanberis, with reference to a break in the conformable succession of the lower beds."

Mr. J. Wyatt read a paper on the "Gradual Alteration of the Coast Line in Norfolk." He began by stating that under the influence of the Atlantic wave villages and many thousand acres of land existing at the Norman survey had disappeared. The changes, however, were not all to the loss of the nation. On the contrary, in West Norfolk there was a continual addition to the area. If they simply regarded the destructive view of the case it would give a very hopeless prospect of the future of Great Britain.

The author proceeded to describe the compensating progress of reconstruction in West Norfolk. At the part of the coast known as the Wash the land was fast gaining on the sea. In the recollection of the author great accumulations of land had taken place, and the ancient port of King's Lynn had been so much affected that navigation had become difficult. The author named especially one part near Nattingham Point, which was at one time deep water, with a safe anchorage, but which was now solid land, and about to be placed under cultivation. It was only a question of time when the whole width of the Wash would be land, except where the channel was conducted and kept secure by the exit of the fresh water and the ebb of the tidal water. Several thousands of acres had been gained, and were now producing fine crops. A secondary object of the paper was to enforce the necessity of an accurate record of the changes of coast lines, and the author suggested that this should be undertaken by a department of the Government.

Professor Oldham, of the Geological Survey of India, read a paper on the geology of that country. He gave a detailed account of the various rock groups, with their fossils, and stated their analogy to those of Europe. With respect to the coal measures, situated in the north of India, and found nowhere else in the country, he said they belonged to the upper coal measures of the south of Europe, and were not of the period of the English formations. Commercially, they were of considerable value. Dr. Oldham remarked on the striking continuity of the great ranges of the system of rocks in India. After some remarks from Colonel Sykes, Sir Charles Lyell said that

Colonel Sykes having exerted himself more than any other to procure the geological survey of India, might well be gratified with the results now brought out in the exceedingly luminous and highly interesting address of Mr. Oldham, which was the first grand general sketch of the geology of India which, he believed, had ever been given.

The President (Mr. Geikie) gave an account of the Geological Survey of Scotland, begun in 1854, under the superintendence of Professor Ramsay. He described on a map the progress of the survey in the various counties in which the work had been entered on, and gave an account of the character of the groups of rocks. The staff, which had been largely increased, were now in Ayrshire. Rather more than 3,000 square miles in Scotland had been surveyed.

The Secretary (Mr. Pengelly) read a letter from the Duke of Argyll to Professor Phillips, giving an account of a discovery which he made the other day at Benmore, in the Island of Mull, where there was the passage of a rock like pure trap into regular granite.

Mr. H. Woodward gave a "Third Report on Fossil Crustacea," and several other papers were read.

At the meeting on Monday, September 9th, Mr. Pengelly read the "Third Report of the Committee for the Exploration of Kent's Cavern, Devonshire." The paper read consisted of a very elaborate account of this richly fossiliferous cave, known as "Kent's Hole," and a number of cases of fossils, containing very many specimens, were produced. The point of interest in the report was the finding of traces of human remains in the old floors of the cavern. One of the discoveries was a marrow bone, which was split longitudinally in a manner impossible to a hyæna, animals whose remains were found in the cave, and which it was impossible to believe could have been split by other means than human agency. To verify his belief in this respect, Mr. Pengelly got the intelligent keeper of the hyænas in the Zoological Gardens, London, to s upply the most powerful hyæna in the gardens with marrow-bones for a whole week, and none of these bones were broken in the same way as those found in Kent's Hole. The conclusion from the discoveries which had been made in the cave was that man occupied Devonshire when it was the home of the extinct lion, rhinoceros, mammoth, and hyæna, the remains of which animals had been found in the cavern. In the stalagmite floor of the cave, 20in. thick, below the black mould and the blocks of limestone on the surface, there had been found part of a human jaw containing four teeth, and lower down a great abundance of beautifully-shaped flint implements; more recently burnt bones, and, as now first reported, bone tools had been discovered. Although no part of the human skeleton had been found below the stalagmite floor, that negative evidence could not be regarded as of any weight; on the contrary, they were entitled to hope that as these investigations were prosecuted they would come upon remains of man, as well as of his works, in the lower deposits. Even if they did not, the evidence was irresistible that Kent's Hole was one of the homes of our ancestors, who were contemporary with the extinct animals, the remains of which were found in the cave.

Sir Charles Lyell expressed the thanks of the association to Mr. Pengelly and Mr. Vivian, his colleague, for their report on the cavern, and remarked that there was evidence that man had been contemporaneous with three different kinds of elephants in Europe.

After some remarks by Professor Phillips, Mr. Vivian, Mr. Wyatt, Mr. Brodie, and others,—

Mr. Pengelly said that the three reports of the committee ought to be studied in connection, in order that the full force of the evidence bearing on the antiquity of man might be appreciated. He had only further to say that if man was found contemporaneous with extinct mammals in Devonshire, that did not fix the antiquity of the human race, for it could not be supposed that this ungenial climate was the cradle of man.

A paper by Professor Ansted, "On the conversion of stratified rock into granite in the north of Corsica," led to some discussion, in which the opinion was generally expressed that granite was not an igneous but a stratified rock.

Professor Sir William Thomson read a paper by Dr. Julius Schvarez, "On the Internal Heat of the Earth." It was stated that 370 underground stations had been examined, and only four of them of had shown a decrease of underground temperature. In some remarks on the paper, Sir William Thomson advocated the Association undertaking borings to ascertain the question of underground heat, as mines were uncertain data on which to proceed. He proposed borings of 200ft. under some African desert, and under an old sea-bottom or lake.

Sir Charles Lyell expressed the opinion that it would probably be found when different portions of the earth had been examined that igneous seas and lakes had been formed first in one part and then in another; that the various parts had been successively melted and cooled, and that it was this, and not an internal igneous core of the earth, which explained the appearance of cooling that was obvious in the rocks.

On September 10th, Mr. E. Hull read a paper "On the Structure of the Pendle Range, Lancashire, as illustrating the South-easterly Attenuation of the Carboniferous Sedimentary Rocks of the North of England." Mr. Hull also read a paper entitled "Observations on the relative Geological Ages of the principal Physical Features of the Carboniferous District of Lancashire." Professors Phillips, Ramsay, and Ansted pointed out the importance of the papers as bearing on the question of obtaining coal in countries further to the east. Professor Ramsay, referring to the circumstance that Mr. Hull is an officer on the Geological Survey, remarked that the two papers were calculated to give people some idea of the exceeding pains taken in the preparation of the maps of the Geological Survey. Mr. Peach read a paper on the fossil fishes of the old red sandstone of Caithness and Sutherland. Numerous other papers were read.

Zoology and Botany.

President, Professor Sharpey; Vice-Presidents, Prof. Allman, Professor Balfour, G. Busk, Professor Christison, Dr. J. Davy, J. Gwyn Jeffreys, Sir J. Lubbock, Prof. Allen Thomson, A. R. Wallace; Secretaries, C. Spence Bate, Dr. Spencer Cobbold, Dr. M. Foster, H. T. Stainton, Rev. H. B. Tristram, Prof. W. Turner; Committee, H. W. Bates, Prof. Bennett, Prof. Bentley, Prof. Oswald Bell, H. Buckley, H. B. Brady, C. Brooke, Dr. F. T. Bond, W. Carruthers, Prof. Cleland, Dr. C. Collingwood, Prof. Dickson, Lieut.-Col. Drummond Hay, R. Dawson, Dr. Anton Dohrn, Sir W. Elliot, H. E. Ellis, Dr. A. Gunther, Sir Duncan Gibb, Dr. Hare, Dr. Heaton, Dr. J. Hunt, W. P. Hiern, Rev. C. Kingsley, E. R. Lankester, Prof. Martins, Dr. M'Intosh, Prof. Macdonald, T. Moore, A. Murray, W. T. Mitchell, Prof. Newton, E. Newton, T. Nunneley, Dr. P. O'Callaghan, Col. Playfair, Dr. R. Parnell, C. W. Peach, Dr. W. H. Ransom, Dr. B. W. Richardson.

In Section D (Biology) the proceedings were opened by an address from Professor Sharpey, the President, after which the section was subdivided. In the first department (Zoology and Botany) Mr. Spence Bate read a report on the fauna and flora of the southern coasts of Devon and Cornwall. The exertions of Mr. Bate had been principally directed to the Crustacea, of which he described some new forms, and several interesting larvæ. Full descriptions and drawings of these animals will shortly be published. Mr. Bate also read lists of annelids, molluscs and fish, which had been observed on the Devon coast.

"Fourth Report on Dredging among the Shetland Isles," by Mr. J. G. Jeffreys.—This report was divided into five heads: 1st, the discovery of new species or forms; 2nd, geographical distribution; 3rd, habits of animals, including those supposed to depend on the depth of water; 4th, geological relations; 5th, extraneous incidents. Under the first head were enumerated six species of mollusca new to the British seas, viz., *Terebra tella Spitzbergensis*, *Rhynchonella psittacea*, *Ledo pernula*, *Siphonodentalium Lofotense*, *Cadulus subfusiformis*, and *Utriculus globosus*. 2nd. The Zetlandic species of mollusca hitherto observed are 383 in all, of which 315 inhabit the north, and 245 the south of Europe. The total number of the British mollusca appears to be 712. Of land and fresh water species 25 only out of 122 inhabit the Shetland Isles. Other particulars were given by way of analysis, and to show the occurrence, for the first time, of southern forms in this district. 3rd. *Natico catena* (a sublittoral species) was dredged alive in from 40 to 50 fathoms. The greatest depth explored by the dredge on the present occasion was 170 fathoms. At this depth, living specimens of 16, and dead specimens of 38, species were procured. The shells dredged from 170 fathoms were of the usual colour; indeed, this was brighter and darker in living specimens of certain species than in average examples of the same species taken in a few fathoms. The notion that colour is absent or fainter in shells from deep water seems to be quite unfounded. 4th. Fossil shells were dredged at depths varying from 80 to 170 fathoms. These belong to species and varieties which inhabit high northern latitudes, and none of them have been discovered living in our seas. 5th. The canine tooth and shoulder-blade of two different quadrupeds were found at a depth of about 85 fathoms, and at the distance of about 25 miles from land. They were unaccompanied by any other terrestrial organisms. The fang of the tooth was corroded. Mr. Jeffreys suspected that this tooth (which Mr. Boyd Dawkins referred to an animal of the weasel tribe) may have been that of a tame ferret which was accidentally killed in 1862, and the carcass of which was then thrown into the sea from his yacht, at a distance of about 35 miles from the place where the tooth was dredged. The bone is supposed by Mr. Dawkins to have been that of a bat; this may have been disgorged or voided by a snowy owl. Dr. Günther added that of the fishes dredged by Mr. Jeffreys two species were new to the British Fauna (although known as Mediterranean), and two other species were new to science. Specimens were exhibited in illustration of the report, including *Spatangus meridionalis*, previously known as Mediterranean, and not as British.

The President drew attention to the importance of Mr. Jeffrey's observation of a bone and a tooth in the dredge. It was a remarkable thing that no bones were dredged up at sea as a rule, and to the palæontologist it was important that the method by which bones are destroyed by the sea should be investigated. —Mr. Jeffreys stated that a gentleman was occupied at the present time in researches on this subject. He also made some additional remarks on the great size of boreal as compared with southern individuals of the same species of mollusc. "Notice of Dredging by the late Dr. Möller off Fair Isle," by Dr. Mörch. "Remarks on Mr. J. G. Jeffreys's Collection of Hebridean Annelids," by Dr. M'Intosh. "On Pelagic Floating Animals observed at Sea," by Dr. C. Collingwood. "Notes on Oceanic Hydrozoa," by Dr. C. Collingwood. "On the Morphology of the Arthropoda," by Dr. A. Dohrn.

At the following meeting on Sept. 6th, Dr. Cobbold read a paper "On the Entozoa of the Common Fowl and of Game Birds in their supposed relation to the Grouse Disease." Dr. Cobbold was very decidedly of opinion that the presence of entozoa had nothing whatever to do with the existence of disease in the bird. The grouse disease had no connexion with any form of entozoa; and the entozoa were, he said, as much in their proper place in the inside of an animal as man was in his proper place on the outside of the globe.

The Rev. H. B. Tristram said he had examined several grouse which he had picked up in the Durham moors, and found that the livers of the birds were reduced to a sort of pulp. He held the disease was peculiarly an epidemic, for the healthiest birds succumbed just as quickly as the weakest. Grouse disease was on the increase, and he attributed this to the slaughter of all the strong and healthy birds by sportsmen and gamekeepers. Gamekeepers were, he said, the most destructive vermin that preyed upon the grouse. A beast of prey when it attacked a covey of birds always struck down the last and weakest of the flock, but the gamekeeper shot the bird that rose first, and thereby the finest and strongest of the covey were taken. In exterminating every animal and bird of prey from our country, we had destroyed the means provided by nature for clearing the land of diseased birds. This was an extremely short-sighted policy, and produced effects the very opposite of those it was intended to produce. Had the buzzard and other birds of prey been left they would have cleared out the diseased birds, and the grouse disease would never have gained a footing. By killing off all the beasts of prey we had exterminated the sanitary police of nature.

After a few remarks from Dr. Cobbold, Professor Busk expressed his concurrence with what Mr. Tristram had said respecting the short-sighted policy of exterminating all the beasts and birds of prey. It was, he said, the opprobrium of the present time, and was producing direful results.

On September 9th, Mr. A. R. Wallace read a paper on birds' nests, in which he sought to show a connexion between the plumage and the nidification of birds, in respect of colour. Some discussion followed as to the causes of the varieties of colour in fish, insects, &c. Dr. McIntosh read a paper on the marine fauna of St. Andrew's, which the president (Mr. Bush) pronounced to be the best contribution to natural history received at this meeting; and several members expressed the hope that Dr. McIntosh would produce a volume on the natural history of St Andrew's.

On September 10th, a preliminary report was read by the Rev. A. Merle Norman, on the Crustacea, Mulluscoida, and Cælenterata, procured by the Shetland Dredging Committee in 1867. Professor Newton read a supplement to a report on the Didine birds of the Mascarene Islands. He also exhibited a large number of bones and drawings to illustrate his paper. The President expressed his regret that so interesting a relic of pre-historic ages should now have become extinct—the dodo having being exterminated by the agency of man. Professor Newton thought that the extirpation of the dodo in the Mauritius was not directly owing to the agency of man, but rather to the fact that great numbers of pigs were turned out loose on the island. These soon decided the fate of the dodo.

Dr. Murie followed with some observations on the service rendered to science by Professor Newton and his brother, Mr. Newton, who had spent a considerable time in the Mauritius, and had thus been enabled to extend his researches into the Didine tribes.

Mr. E. J. Lowe then read a paper on "Abnormal Forms of Ferns." Professor Balfour gave a notiee of some rare plants recently collected in Scotland. Dr. Grierson described "The Destruction of Plantations at Drumlanrig by a species of Vole." He exhibited a piece of timber operated on by voles, and also a couple of specimens of the latter species of animals. He accounted for the great increase of voles by the persistent destruction of weasels and similar animals. The voles resembled mice to a very great degree, but were really more closed related to the beaver tribe.

Dr. Spencer Cobbold considered the paper another confirmation of the folly of seeking to contravene the laws of nature, and depriving ourselves of the natural assistance afforded by certain kinds of wild animals.

Professor Newton thought that the whole question was one closely connected with the game laws. The latter would shortly require to be taken up by the section. In every country, republican as well as others, there was a necessity for protecting certain animals by fixed laws. We would require to assimilate our game laws to those of France, by which shooting is altogether prohibited during certain months.

The Rev. Dr. Esdaile spoke in favour of the conservation of moles.

The Rev. H. B. Tristram then read a paper "On the Zoological Aspects of the Grouse Disease." Like his friend Professor Newton he thought that our present game laws should be extended to all birds out of season, and some limit put to the destruction of birds' nests. No class of men had exhibited such gross ignorance on this subject as the members of the House of Commons or country gentlemen in general. Had they studied the moral law of Moses there would not have been so much talk of the grouse disease. In the latter case the destruction of birds of prey was one of the most productive elements of evil. Had there been abundance of birds of prey, all the weaker grouse, all those affected with disease, would have fallen quickly, and thus the "plague" would have been "stamped out."

Sir James Alexander was at one on the subject with Mr. Tristram, as his personal observations had all tended to the belief that birds of prey were the most effectual preventives to disease in birds. In particular he defended the owl as in reality one of the chief protectors of game. As for the weasel it always attacked diseased birds. The balance of nature had been so much disturbed that it was very difficult to set it right. In the Highlands some trout streams had been depopulated by the ravages of rats which were not kept in check by animals of prey.

Dr. Murie thought that the game laws should be altered, so as, by consulting the various habits of game, to close shooting at certain seasons of the year.

Dr. Grierson then replied to some questions which had been put to him in regard to his paper. Voles, he said, seemed pretty generally distributed over the British Isles. They were comparatively harmless, unless allowed to grow to great numbers by the destruction of the natural police of the forest.

The Duke of Buccleuch confirmed Dr. Grierson's observations on the destruction of plantations at Drumlanrig by voles. He agreed with the other speakers in their animadversions against the system of destroying wild animals of prey. Entirely to extirpate the latter would be a great mistake. As for the game laws, what was required was really a law for the general preservation of animals. There was only one wild animal in this country which enjoyed that protection, and that was the noble animal—the fox.

Sir James Alexander next read a paper "On the Preservation of Fishing Streams," which led to some conversation as to the means that ought to be taken for the purification of rivers.

Geography and Ethnology.

President, Sir S. Baker; Vice-Presidents, Sir J. E. Alexander, Admiral Sir E. Belcher, J. Crawfurd, Colonel Sir H. James, Sir J. Lubbock, Sir R. I. Murchison, Admiral E. Ommanney, General Sir A. S. Waugh; Secretaries, H. W. Bates, Cyril C. Graham, Clements R. Markham, S. J. Mackie, R. Sturrock; Committee, Professor D. T. Ansted, J. Arrowsmith, Sir D. Baxter, W. E. Baxter, H. G. Bohn, Sir J. Bowring, Bishop of Brechin, W. Brand,

G. Busk, C. Holt Bracebridge, Dr. P. O'Callaghan, Dr. Cuthbert Collingwood, R. Dunn, Dr. Davie, Sir W. Elliot, General Sir Vincent Eyre, J. Ferguson, Rev. Dr. Ginsburg, H. Gourlay, Dr. J. Hunt, M. N. de Khanikof, Prof. A. Newton, Sir J. Ogilvy, Lieut. S. P. Oliver, Sir A. Phayre, Col. R. L. Playfair, J. Ramsay, J. Sydney Smith, Rev. H. B. Tristram, J. White, J. Yearman.

Thursday.—The President, in opening the business of the Section, said, that Geography was worthy of the high position it occupied in the British Association ; as nearly every science was dependent on our accurate knowledge of the earth. Astronomy would afford but meagre results if we were ignorant of the spherical form of our world, and if our observations were confined to our own cloudy shores ; but our observations are directed from stations in all positions on the globe, the knowledge of those positions being due to our first explorers. Ethnology was the twin sister of geographical science, as the numerous races of human beings (so diverse and inexplicable) that inhabit the various portions of the earth, from the ice-bound regions of the Arctic circle to the burning deserts of Africa, would have been unknown but for the researches of geographical explorers. Theology was closely interwoven with the study of Geography. The most important events have occurred in certain places that throw intense interest upon the science. The wanderings of certain nomadic tribes, seeking for new pastures for their flocks, have brought to light new countries and have implanted new religions. Far distant lands, tenanted by savage races that knew no God, rescued from a state of barrenness, are smiling with prosperity ; the wild beasts and the heathen have retreated before advancing civilization ; and the sound of the church bell rings at our very antipodes. The advancement of Christianity is dependent upon the migrations of Christians that shall implant the seed of truth in foreign soils. Those migrations are dependant on geographical discoveries, that bring to light countries and climates favourable to the development of European races. Thus civilization will advance to a higher standard in such latitudes as are conducive to industry and enterprise. The severity of an Arctic region would be as great a barrier to the intellectual progress of the inhabitants as would the burning sun and barren sand of the desert, where Nature has withheld every blessing from mankind. In such localities human energies are overpowered by the oppression of circumstances ; and a high standard of civilization can never be attained. The discovery of countries that afford the requisite conditions for a high civilization has been the grandest result of comparatively modern Geography. The voyages of the ancients were generally confined to coasting or to crossing narrow seas by the guidance of the stars, in precisely the same manner as performed at the present day by the Arabs in navigating the Persian Gulf and the Red Sea. Although the enterprise of the Greeks and Phœnicians had overcome the difficulties of the Mediterranean, and had established trading stations on the east coast of Africa, their explorations were bounded by that impassible barrier to the West—the Atlantic ocean. They had visited Zanzibar, and had heard of the existence of the great lakes which Ptolemy long afterwards placed upon his map from the description of ancient merchants as the sources of the Nile ; but from the beginning of the world up to the fifteenth century no human eye had pierced the mystery of the Atlantic. At that time there were two great geographical questions to be solved—the Nile and the Atlantic. The fifteenth century was rich in geographical discovery. Marco Polo's travels in Asia had brought renown to Venice, and Vasco de Gama had, by the circumnavigation of Africa, sustained the honour of Portugal, which enterprising country assumed the lead in exploration until Columbus achieved the feat that completely altered the geography of his age—the discovery of America. In the short period of 380 years what vast changes have occurred, not only in geographical discovery, but in its results. America has become a giant. With every variety of climate, from the frigid to the torrid zone, with fertile soil, boundless forests, navigable rivers of prodigious extent, and commodious ports, the future of that wonderful country may be prognosticated by a comparison with the past. If possible, more wonderful in rapid advancement is that extraordinary country at our antipodes, Australia. It is natural to our insular position that geographical science should be more deeply appreciated in England than in other countries. Our strength lies in our commercial enterprise. Our commerce depends on our colonies ; these encircle the world. Thus geographical knowledge must be an important element in English education, as hardly a family exists in the United Kingdom that is not represented by one or more of its members either in India or the colonies. Without yielding to exaggerated alarm, we must watch with intense attention the advances of Russia upon the Indian frontier ; and beyond all other geographical enterprises, we should devote extreme interest to a new and direct route to India by the Euphrates Valley and the Persian Gulf. Thanks to the untiring zeal of its President, the Royal Geographical Society of London has attained such a position that there is no exploration of importance undertaken in any part of the world without its knowledge and attention. Thus, not only are we in England forewarned of the encroachments of neighbouring powers, should their expeditions be pushed beyond the limits of necessity, but we form a nucleus for all geographical information, should the Government resort to us for that requirement. Free, however, from all jealousy, and above suspicion, the society has this year awarded to the Russian Admiral, Boutakoff, the Founder's Gold Medal, for having been the first to launch a steamer on the Sea of Aral and to conduct his vessel upwards of 500 miles along the course of the river Jaxartes. The attention of geographers has lately been turned to the remarkable journey of M. Gerhard Rohlfs, a young German traveller, who had been expected to visit Dundee, but had been prevented by illness. He had lately returned from an exploration which had led him entirely across northern Africa from north to south. Entering at Tripoli, he had followed an entirely new route, *viâ* Ghadames to Murzuk ; had thence travelled to Kuka, on the shores of Lake Chad, where he had been hospitably received by the Sultan of Bornou, and enabled by his protection and assistance to cross the country southward to the Benuwé, whence he had reached the Niger, and from Rabba crossed the forest country of Yoliba to Lagos in the Bight of Benin. Another recent communication which had been received by the Royal Geographical Society related to the Russian settlements in Manchuria, and gave an account of the great progress made by this advancing power in exploring the difficult country between the frontier of Korea and their Siberian posts on the Amur, *viâ* Lake Khinka and the Usuri river. With regard to the fate of Livingstone, he (the President) regretted to be forced to the conclusion that the great traveller was dead. The hopes of those who believe the contrary rest on the well-founded belief that the Johanna men who had escaped the slaughter and brought home the news had trumped up the story to excuse their return. It was this very fact of their power of consummate lying that convinced him of the substantial truth of their statement. Natives are scientific liars; they do not lie absurdly, like Europeans, but they concoct their falsehoods with such forethought that the lie itself is an example of profound skill. No native would commit himself to so inartistic a lie as to declare a man to be dead who is still alive, and who might become a witness at a future time against him. Should natives intend to desert their master, they invariably plead excuses that cannot be proved to be false, such as sickness or pretended lameness, that incapacitates them from marching; but the hardihood of the Johanna men in committing themselves, by the confession of their cowardice, is a surprising instance of veracity that could only have been prompted by the urgency of the calamity. The death of Livingstone was a fearful drag on the wheel of African exploration. We know but a portion of those immense lake reservoirs in Central Africa; and geographers will not remain content with the bare fact that the Nile issues from those lakes. England, that has untied the knot, must gather in the extremity of the line.

Lieutenant S. P. Oliver, R.A., F.R.G.S., read a paper descriptive of two routes through Nicaragua, with the view of opening up interoceânic communication through that country between the Atlantic and Pacific.

A paper by Captain Maury, on the "Physical Geography of the Nicaragua route," was read by Mr. Bates. After a description of the phenomena of the equatorial cloud ring, the writer said—To determine the motions of this cloud ring from north to south, and from south to north again, to determine the march of their rains and their rate of travel into the interior from the Caribbean Sea and the Gulf of Mexico on the one side and from the Pacific on the other, is one of the most interesting and suggestive meteorological problems of the day.

On September 6th, SirSamuel Baker took the chair at a quarter past 11, and stated that the first business would be a report of the Palestine Exploration Fund, which, he mentioned, commenced in a proposal for carrying a water supply to the city of Jerusalem. From that arose the idea of a Palestine exploration, the funds for which were commenced by that benevolent lady, Miss Burdett Coutts, followed by £100. from the Royal Society, £100 from the Royal Geographical Society, and £100 from this association.

Captain Wilson then reported that of the sum of £100 granted last year by the British Association to the Palestine Fund, one moiety had gone towards the costs of Lieutenant Warren's explorations, and the other to the purchase of instruments for meteorological observations in Palestine. Lieutenant Warren's reports and plans had not been completed, but the following results had been already obtained:—The construction of a map on the scale of one inch to the mile of the highland districts of Judea to the north-west and south-west of Jerusalem, of the Jordan valley to about 16 miles north of the Dead Sea, and of a large portion of the plains of Philistia. Those surveys, accompanied by those made by Wilson and Anderson in 1865–6, gave for the first time materials for a correct map of about three-fourths of the Holy Land. At Jerusalem a very important discovery had been made outside the south wall of the sacred enclosure (Haram Esh Shereif)—namely, that the live rock of the hill overlooking Kedron was no less than 53 feet below the present surface, and the great south wall of the Haram has been traced down to that depth, making it in all 130 feet high. In addition, the east wall of the Haram has been found to run on beyond the present south wall, and a second south wall had been discovered 20 feet distant from that already known. At the northern extremity of the city, close to the Damascus gate, foundations of massive walls and of a tower had been uncovered, and Lieutenant Warren was at present engaged in some interesting excavations in the Valley of the Kedron and on the site of the Hospital of the Knights of St. John, near the Church of the Holy Sepulchre. The sum of £50 granted for meteorological purposes had been expended under the superintendence of Mr. Glaisher in the purchase of instruments for the stations of Beyrout, Damascus, Jaffa, and Nazareth, which would enable them, with the observations taken at Jerusalem by Dr. Chaplin, to form an accurate knowledge of the climate of Palestine.

Captain Wilson then read a paper on the recent discoveries in and around the site of the Temple at Jerusalem. "Notes of a Reconnaissance of some portions of Palestine," by Lieut. Anderson, were read by Mr. Bates.

Sir Roderick Murchison made a statement on the subject of the Livingstone search expedition. He stated that Livingstone's object when he set out was to discover whether there was an outlet to the south from Lake Tanganyka, discovered by Burton and Speke, which was a fresh-water lake, and which, but for such an outlet as was supposed to exist, ought to be a saline lake. Livingstone started from the east coast of Africa and reached the north of Lake Nyassa, and had settled the point that there was no communication between Tanganyka and Nyassa, and there was considerable interest now attaching to the question whether Lake Tanganyka might not be in communication with the lake Albert Nyanza, discovered by Sir Samuel Baker, on the north. In order to reach the south end of Tanganyka Livingstone took carpenters to prepare boats, and was prepared to sail to the north end of that lake to determine if there was an opening there either to the Albert Nyanza or to the Victoria Nyanza. If he was alive, he must have passed to the Albert Nyanza, from which he was to descend the Nile. Should he accomplish that object he would then certainly be the most glorious of all explorers in African geography. Having traversed and retraversed Africa several times with black men only, and once before not having been heard of for above a year, there was no occasion for anxiety although he had not been heard of for that time. If he had escaped, they might depend upon it he would go on fearlessly, and on getting to the centre of Africa a long time must elapse before he could be heard of. As to Mousa's testimony of his death, it stood alone, for none of the other Johanna men were present at the alleged murder, and Mousa was not only a liar but a thief, and had, when examined by the Bombay sepoy who had accompanied Livingstone on a part of his journey, given a totally different version from what he had given to Dr. Kirk, having stated to the latter that he was murdered by the blow of a hatchet, and having stated to the sepoy that he was shot to death by arrows. As to Mousa's story that the Johanna men had recovered the body of their leader and buried it, he did not believe that so great a coward as Mousa, who stated that he had concealed himself when his leader was attacked, would have had the heroism to go and make a search for his body. But, whatever the fact, he felt, as President of the Royal Geographical Society, that it was their bounden duty make a search for Livingstone, and he had accordingly urged on Government to send out an expedition to determine the truth of the matter. To the great honour of Her Majesty's Government, this proposal had been most cordially responded to, particularly by Mr. Corry and the authorities of the Admiralty, and the details of the expedition had been most zealously worked out by the Hydrographer of the Admiralty, Captain Richard. As leader of the expedition they had chosen Mr. Young, a warrant officer who had spent two years on the Zambesi river with Livingstone, who knew the natives well, and was perfectly competent to manage them, and who entertained the same hope that he and others did, that Livingstone might be alive. The object of this expedition, which reached the Cape on the 15th of July last, was to get to the north end of Lake Nyassa, about 30 miles from which was the spot of the alleged murder. The party consisted of only three Europeans —namely, Mr. Young, Lieutenant Falconer—a gallant volunteer in the service, and who had been with the 17th Lancers in India—and a seaman who, like Mr. Young, was acclimatized; and though only three men had been accepted, it was to the honour of this country that between 50 and 60 applications had been received from young men in various walks of life to accompany the expedition. They were to be accompanied with a party of Africans and men to sail up the Zambesi, thence up the Scheri, getting the natives to carry their steel boat, which could be taken to pieces, for about 30 miles past the Murchison Falls. After getting past these falls they would again launch their boat and reach Lake Nyassa, and were to explore the east side of that great lake, as Livingstone had done the west. If Livingstone was dead, the expedition party were sure to fall in with memorials of him—his clothes, his apparatus, or, above all, his notes, for to written documents the natives attached immense importance; and all these would be sure to find their way down the lake in the course of native trading. Every article belonging to the German traveller Rocher, who was killed in a quarrel with the natives, had been recovered in this way, and it was impossible that the same traces of Livingstone, if he were dead, could escape the search to be made. The expedition would occupy the party at least till the end of November, and he hoped that by Christmas they would have received such tidings of them as would solve the problem. Sir Roderick concluded by some remarks on the great unexplored regions of Africa, which would probably continue to engage the attention of geographers for centuries to come.

On September 7th, Mr. Crawfurd, President of the Ethnological Society, contributed a paper "On the Antiquity of Man," which was read for him by Mr. Bates. It dealt mainly with the testimony for such antiquity of man as was independent of his own remains, but was prefaced by some observations on the causes which accounted for the paucity of man's own remains. Coming to the subject of this paper, Mr. Crawfurd referred to language, the art of writing, the cultivation of the cereals, and the domestication of animals, many of which had disappeared altogether in their wild state, as so many evidences of man's antiquity. He went on to say. Of all parts of the world the valley of the Nile was most likely to have generated an early civilisation, and to have preserved a record of it, and they might safely believe that Egypt was one of the countries in which arts and letters made their earliest advance. The history of the Jews could pretend to no such antiquity as that of the Egyptians, or even as that of the Chinese. The earliest date which, with any show of authenticity, could be ascribed to the history of Egypt began with the first dynasty of civil rulers, which (taking the dates from the learned work of Leseuer, a pupil of Champollion) corresponded with 8986 B.C., thus making the first dawn of reliable history 10,833 years old. The Pyramids of the first dynasty were built, according to the same authority, B.C. 3460, and the Great Pyramid B.C. 3280, respectively 5,327 and 5,127 years ago. Although the Jews were intellectually greatly superior to both Egyptians and Chinese, still they were a small people, inhabiting a comparatively poor and narrow territory, while they were at least as much a pastoral as an agricultural nation. They had no enduring architectural monuments, for their peculiar religion confined their public architecture to a single temple, a fact which attests the smallness of their numbers and the narrowness of their territory. Even this one temple, which in size did not exceed an ordinary London parish church, was built for the most part of perishable materials, their want of skill obliging them to have recourse to the more advanced commercial States of the Mediterranean coast for artisans, for timber, and for the metals. The early Jews, however, had long passed all the first stages of man's progress; for they possessed an adequate scale of numbers, a calendar, and even the art of writing, almost as soon as we have the first mention of them. All our evidence for the antiquity of the Jews is to be gathered from their sacred writings. There is a general assent among critics in fixing the building of the Temple to the year before Christ 1015—a date which would make it 2,445 years later than the construction of the oldest of the Pyramids. Reckoning backwards, the Exodus preceded the building of the Temple by 480 years, and the bondage in Egypt is given as having lasted 430 years. These united sums give the year B.C. 1925, and beyond this we cannot carry the chronology of the Hebrews, unless it be the arrival of Abraham in Egypt, which is given as B.C. 2499, which would make this event to have happened 789 years posterior to the building of the great Pyramid. After some remarks on the respective antiquity of Assyrian, Hindu, and Chinese civilisation, Mr. Crawfurd concluded with a recapitulation of his argument, maintaining that man was of vast antiquity, and that the portion of his existence which had transpired since he acquired the art of making a durable and authentic record of it was but a very small fraction of it.

Mr. P. N. Compton contributed a paper on the "Coasts of Vancouver's Island and British Columbia," which was read by Mr. Bates.

Mr. J. J. Pratt contributed a paper on the "Colony of New Scotland," in South Africa, which was also read by Mr. Bates.

Mr. Crawfurd contributed another paper, "On the Complexion, Hair, and Eyes as tests of the Races of Man," which was read by Mr. Mackie. He maintained that the hypothesis of climate could no longer be set forth as the cause of colour in the human complexion. If, then, the variety of colour be not the effect of climate, from what cause was it derived? This was one of those inscrutable mysteries of nature which we could not solve any more than we could the varieties of colour in the species of the lower animals. Nature had made colour a distinction of species in the lower animals, and it had done the same, although less definitely, in the races of man, and in both cases they were equally ignorant of the grounds on which it had done so.

Mr. Crawfurd also contributed a paper upon "The supposed Aborigines of India as distinguished from its Civilised Inhabitants." A paper was contributed by Mr. H. H. Howarth, on "Some Changes of Surface affecting Ancient Ethnology," the heads of which were read by Mr. Mackie.

On September the 9th, Sir John Lubbock read a paper on the "Origin of Civilisation and the early condition of man." Sir John said—Many writers have considered that man was first a mere savage, and that our history has on the whole been a steady progress towards civilisation, though at times, and sometimes for centuries, the race has been stationary, or even has retrograded. Other authors of no less eminence have taken a diametrically opposite view. According to them man was from the commencement pretty much what he is at present—if possible, even more ignorant of the arts and sciences than now, but with mental qualities not inferior to our own. Savages they consider to be the degenerate descendants of far superior ancestors. Of the recent supporters of this theory, the late Archbishop of Dublin was among the most eminent. Having briefly considered the arguments brought forward by Archbishop Whateley, Sir John proceeded to state some facts which seemed to militate against the view he advocated. First, said he, I will endeavour to show that there are indications of progress even among savages; secondly, that among the most civilised nations there are traces of original barbarism. It is, I think, improbable that any race of men who had once been agriculturists and herdsmen should entirely abandon pursuits so easy and so advantageous, and it is still more improbable that, if we accept Usher's very limited chronology, all tradition of such a change should be lost. Moreover, even if the present colonists of (say) America or Australia were to fall into such a state of barbarism, we should still find in those countries herds of wild cattle descended from those imported; and even if these were exterminated, still we should find their remains, whereas we know that no trace of a bone either of the ox or of the domestic sheep has been found either in Australia or in the whole extent of America. In the case of the horse the same argument points to Australia but not America. So, again, in the case of plants. We do not know that any of our cultivated cereals would survive in a wild state, though it is highly probable that, in a modified form perhaps they would do so. But there are many other plants which follow in the train of man, and by which the botany of South America, Australia, and New Zealand has been almost as profoundly modified as their ethnology has been by the arrival of the white man. The Maoris have a melancholy proverb that the Maoris disappear before the white man, just as the white man's rat destroys the native rat, the European fly kills the Maori fly, and the clover kills the New Zealand fern. We may, therefore, safely assume that if Australia, New Zealand, or South America had ever been peopled by a race of herdsmen and agriculturists, the fauna and flora of these countries would almost inevitably have given evidence of the fact, and differed much from the condition in which they were discovered. We may also assert on a general proposition that no weapons or instruments of metal have ever been found in any country inhabited by savages wholly ignorant of metallurgy. A still stronger case is afforded by pottery. Pottery is not easily destroyed; when known at all it is always abundant, and it possesses two qualities there—namely, that of being easy to break and yet difficult to destroy, which render it very valuable in an archæological point of view. Moreover, it is in most cases associated with burials. It is, therefore, a very significant fact that no fragment of pottery has ever been found in Australia, New Zealand, or the Polynesian Islands. It seems to me extremely improbable that an art so easy and so useful should ever have been lost by any race of men. Moreover, the art of spinning and the use of the bow are quite unknown to many races of savages, and yet would hardly be likely to have been abandoned when once known. The absence of architectural remains in these countries is another argument. The mental condition of savages seems also to me to speak strongly against the "degrading" theory. I have elsewhere pointed out that, according to the almost universal testimony of all writers on savages—merchants, philosophers, naval men, and missionaries alike—there are many races of men who are altogether destitute of a religion. The cases are, perhaps, less numerous than they are asserted to be, but many of them rest on doubtful evidence. Yet I feel it difficult to believe that any people which had once possessed a religion would ever have entirely lost it. Sir John proceeded to mention cases in which a limited improvement had taken place. After adverting to the unlikelihood of races possessing a knowledge of numbers losing it again, Sir John then referred to various circumstances which seemed to show that even civilised races were once in a state of barbarism. He then briefly adverted to the argument derived from an alleged universality of certain customs. While I do not believe that similar customs in different nations are "inherited from a common source," or are necessarily primitive, I certainly do see in them an argument for the unity of the human race, which, however, be it remarked in parenthesis, is not necessarily the same thing as the descent from a single pair. In conclusion, then, while I do not mean for a moment to deny that there are cases in which nations have retrograded, I regard these as exceptional instances. The facts and arguments I have adduced afford, I think, strong grounds for the following conclusions—namely, that existing savages are not the descendants of civilised ancestors; that the primitive condition of man was one of utter barbarism; that from this condition several races have independently raised themselves. These views follow, I think, from strictly scientific considerations. We shall not, however, be the less inclined to adopt them on account of the cheering prospects which they hold out for the future.

A paper was read, contributed by Messrs. Wallace and Mayne, on the "Peruvian Expedition to the River Ucayali." This expedition was undertaken at the instance of the Peruvian Government with the view of discovering a river route to the eastern slopes of the Andes in Peru, by which the produce of the country might be sent to Europe without crossing the Andes. The vessels penetrated two rivers hitherto almost unknown; and reached towns not far from Lima, thus establishing a navigable route on the Amazon and its tributaries for 3,700 miles, by which goods might be shipped from Peru to Europe or *vice versa*.

Dr. Collingwood read a paper giving an interesting description of a boat journey round the north end of the island of Formosa in the China seas.

Dr. John Davy, the Inspector-General of Hospitals, contributed a paper on the "Character of the Negro, chiefly in relation to industrial habits." Dr. Davy stated that his object was to vindicate the negro from the reproach of being a sluggard or idler, and to show that he was, under continued education, in favourable circumstances, and unenslaved, capable of being civilised, and of making progress in the liberal arts and sciences.

A discussion took place on the subject of the paper. Mr. Crawfurd remarked that the island of Barbadoes, from which the most of Dr. Davy's examples were taken, was in an exceptional condition as regarded the negro race, being so densely populated that the negro must either work or perish. Dr. Hunt said that, as far as regarded bodily strength and the power of resisting heat, the negro was the best adapted of all the dark races for labour in a hot climate, and he really did not understand why he should be so unwilling to work. He hoped some day we might be able to remove the objection the negro entertained to free labour. Speaking of the condition of the freed Americans, he quoted testimony to show that the freedmen were in a most distressing condition in some parts of the States. Mr. Brewin, Cirencester, maintained, on the other hand, that the negro was as willing to work, if fairly treated and regularly paid, as any coloured man on the face of the earth. Having gone to Jamaica to inquire for the Society of Friends as regards the disturbed state of the island, he made a statement highly favourable to the diligence and energy of the negro. Mr. Davis said that Mr. Brewin's description was quite contrary to scientific facts as regarded the negro, and he had quite failed to take into account the percentage of white blood in the negroes of Jamaica. It was that infusion alone which made the Jamaica negro what he was; otherwise he was quite incapable of that continuous labour on which the prosperity of every community was based. Dr. Davy replied, mentioning the names of many negroes possessing great intellectual powers; and Mr. Crawfurd closed the discussion with some remarks to the effect that it was only when in contact with the white man, and through the infusion of white blood, that the negro had ever risen out of savagery. He rejoiced that the negroes had been freed, but he thought the slaveholders' property in negroes should, as in the case of our West Indies, have been compensated, not confiscated.

At the meeting September 10th, Mr. Bates read the abstract of an elaborate paper by M. du Puydt on an exploration of the Isthmus of Darien, with the view of discovering a practicable line for a ship canal. M. de Puydt, in this paper, reported that he had discovered a break in the Andes, which rendered practicable the formation of a ship canal between the two oceans. He made an exploration up the river Tennella, a small stream descending from the eastern slope of the Andes into the Bay of Carthagena. He found little difficulty in making his way to the watershed, which he stated was a low plateau, estimated to be about 140 feet above the level of the sea, this elevation continuing about five miles. He had no instruments for precise measurements, but estimated the height from the rapids in the river. The Indians were, upon the whole, friendly, though they tried hard to deter him by accounts of the difficulties he would encounter. The exploration was only carried to the summit, but from that point the country westward towards the Pacific was described as being perfectly level. No life was lost in the expedition, and sickness was escaped.

Sir R. Murchison, after adverting to the disasters which befel the Scotch colony at Darien nearly two centuries ago, said he did not think Darien would ever hold out any inducements to colonists, nor did he think there was any clear light shed by this paper on the practicability of forming a good and safe ship canal. The project, however, had long been entertained, and Humboldt always said, and, indeed, had said to himself, that if ever a passage was effected through any portion of this isthmus it would be by the route which M. de Puydt had described. An unsuccessful effort had been made seventeen years ago to open this route.

Mr. Crawfurd read a paper on the "Supposed Plurality of the Races of Man." He said it had long been a popular belief among the nations of Europe, but chiefly confined to them, that all the diverse races of man were sprung from a single family, and that wide differences in complexion, features, bodily form, and intellectual qualities, which now existed, were but varieties, the result of long time and the operation of climate and localities. He believed this view to be contrary to nature, unsupported by historical facts, and to be against all probability. What the races of man now were they had been from the earliest dawn of authentic history. The Egyptian and negroes on the Nile monuments were the same as the Egyptian negroes of the present day, and the skeletons found in connection with lacustrian dwellings in Swiss and Belgium were identical with the skeletons of the civilised inhabitants of Switzerland and Belgium of the present day. Mr. Crawfurd went on to speak of the limited knowledge the ancient races had of each other, and of the absence of the means of emigration or dispersion. If the most civilised potent, and enterprising nations of antiquity had power to acquire but a partial knowledge of the earth and its inhabitants, how could they imagine that feeble savages were able to surmount far greater difficulties than they did? They might, he thought, safely conclude, that when the earth assumed its present form, species of man were distributed over the surface in the same manner as species of the lower animals and of plants. The spread or dispersion of man, according to the popular theory, would have amounted to nothing less than a miracle; but a miracle was a cause inadmissible in science, or at least ought to be restricted to the one great and for ever inscrutable secret, the Creation itself.

Mr. Vivian agreed with the views of Mr. Stuart Poole, of the British Museum, as to different centres of creation, and successive interpositions of creative power in the creation of man, of which the Scriptures recorded the latest. He pointed out the accord between the account of creation in the first chapter of Genesis and the geological testimony as to the order of creation. He felt that those who were most desirous to support the Mosaic record must yet surrender the idea of the earth being only 6,000 years old; and he thought if the Biblical statements were fairly studied it would be seen that there was first a record of the creation of man; male and female, and then a record of the creation of Adam, the progenitor of a later and more intellectual race. The fact that Cain, the son of the first pair in this race, sought divine protection lest any man should slay him for his brother's murder, sufficiently indicated that the earth was populated by other families than that of Adam, as Cain could not have referred to his own brethren, while the fact of his taking wives seemed to lead to the same conclusion. In the lake dwellings and in Kent's cavern they found human remains evidently of a very high antiquity, and who could not have come from the Paradisaic source.

Mr. Wallace supported the views of Mr. Darwin as to unity of origin, and instanced the pigeon as a case of extraordinary variety proceeding from one type. Mr. Crawfurd had said that no barbarous races had the power to spread over the world, yet it was undoubted that the New Zealander originally came from the Friendly Islands, in the Pacific, to which also the Sandwich Islanders were to be traced, and that there was a powerful Malay element even in Madagascar, a distance of 2,000 miles from the Malayan races. Allowing for the great epoch that must have elapsed since the appearance of man, and the great variety of chances that must have occurred to him, he saw no difficulty in supposing that he might gradually spread over the earth from a single centre.

Mr. Crawfurd, in his reply, ridiculed the Darwinian theory, and with respect to savage emigration, said the instances given were comparatively recent, after the races in question had come to be able to build powerful boats, and were expert seamen, so that the facts cited by Mr. Wallace were not to the point. For himself, he had no faith in a monad selecting anything. He did not believe that donkeys ever became horses, pigs, elephants, or monkeys men.

Mr. Cyril Graham then made a statement as to the proposed explorations in Palestine. He said the object of the association he represented was to investigate the ethnology and topography of the Holy Land. The first thing they wanted was a trigonometrical survey. They also wanted to know the geology of the mountains, the fossils they exhibited, the nature of the soil, the trees and flora, the fishes of the sea of Tiberias, and all the phenomena of that wonderful region, the Valley of the Dead Sea. They wanted a catalogue of the beasts, in which the crocodile would appear, and of all the birds, butterflies, moths, and beetles. In fact they wanted to have re-written the great work of Solomon, which had not been handed down, on the natural history and productions of the land. Then beyond the Jordan they found a great field of labour—in the cities of Bashan and Gilead, where many remains of ancient art were to be found. They wanted to examine every point which could throw light upon the cradle of their faith, so that we might read with greater intelligence and more vivid interest the graphic delineations of the Holy Scriptures.

General Lefroy warmly commended the expedition to the support of the public, and Sir Roderick Murchison expressed his sense of the great value of the researches of Mr. Cyril Graham.

Correspondence.

[*Under this head we shall be glad to insert any letters of general interest.*]

NATURALISTS' MUSEUMS.

SIR,—I see in this month's NATURALIST'S NOTE BOOK that a committee of naturalists have offered a series of prizes for the best collection of plants, shells, fossils, &c., &c. This is at Newcastle-on-Tyne. I have long thought that such a thing might be formed in the neighbourhood of London; in fact, a "Juvenile

Museum and Scientific Institute." I feel that such a thing would be well supported; prizes might be offered for the best collections of shells, fossils, minerals, &c., &c. Surely there are learned scientific gentlemen who would help to form such a thing.

If any of your readers think the idea worth their notice, I should be very glad to correspond with them on the subject.

Trusting you will give publication to this letter,

I remain, Sir, yours obediently,

A JUVENILE MEMBER OF THE RISING GENERATION.

London, S., September 3.

BIRDS OF PASSAGE, AND MIGRATION OF INSECTS.

SIR,—Your correspondent "R. W. B." (page 221) very properly draws attention to the migration theory of birds, propounded by Alfred Leigh Hunt, in page 164 of the NATURALIST'S NOTE BOOK.

This new theory assumes several things which require proof, and the propounder, for brevity's sake I presume, is not too explicit. Would "A. L. H." have us to infer that the whole atmosphere, by land and sea, is crowded with insects? Or do his migratory bands of insects move in columns? Were an atmospheric change, or some meteoric agency to kill the insects, would that occurrence interrupt the migration of birds? Certainly not, is my opinion. But what new theory ever met with a favourable reception? Naturalists tell us, and observations prove, that many birds of passage return to the same place for years. Beranger must have thought so of swallows when he says:—

> O swallows, swallows, tell them not,
> When back ye fly o'er land and sea.

Now, Sir, sure this periodical return would induce us to suppose that something more than mere epicurean promptings led them to "the old familiar spot." With "R. W. B." I am quite prepared to think that some instinctive love of change induces the birds to migrate, and, with him, I also believe that the short life of insects militates against A. L. Hunt's theory. The very fact of supposing the migration of birds to depend on a continual supply of insects sets out on the hypothesis that insects themselves migrate, and if this migration implies long flights of thousands of miles, it really seems hard, without further and stronger proofs, to accept the theory proposed by A. L. Hunt. But, for the sake of argument, let us for a moment accept the theory under consideration—the birds find insects in abundance; if so, why do they (the birds) come so far, and particularly to *the same places* every year, unless the insects migrate in dense animated zones, simply for the convenience of the birds, and that the birds must, from absolute necessity, follow the insect battalions? But, Sir, in the theory we are trying to examine, the insect migration may not be so great as to extend to thousands of miles, nor even to a hundred miles; but then, in crossing oceans, I fear the new theory must, in order to supply insects for the feathered wanderers, fall back on the much disputed hypothesis of *spontaneous generation*—a thing itself not generally admitted, and still requiring proof. It often happens that swallows, in immense numbers, light on ships, and the testimony of the sailors invariably is that the poor birds are something like skeletons. Sir Charles Wager, Lord of the Admiralty, when in the British Channel, had his deck, rigging, &c., &c., crowded with swallows, and he describes them as *spent and famished and only feathers and bones.* Surely the insects had been scarce by the way. And Adamson, the naturalist, who went to Africa for the express purpose of collecting information regarding the migration of birds, &c., &c., in speaking of the swallow, says:—"These birds pass the seas to get into the countries of the torrid zone at the approach of winter in Europe." This keen observer had missed the insects on their long rambles.

Another writer, in speaking of the swallows at Senegal, says:—"For, as I have elsewhere mentioned, they (the swallows) do not build their nests in this country, but only *come to spend the winter.*" And Sharon Turner, writing in 1829, says:—"The roofs of the houses were covered with thousands of the swallow tribe, which had there assembled preparatory to their annual *migration to a warmer climate.*" A hundred and twenty years ago Klein, a German naturalist, stiffly argued that there was no such thing as the migration of birds; the test of time proves he was wrong. And now, Sir, that Alfred Leigh Hunt proposes and maintains that the migration of birds is but a result of the migration of insects, I for the present leave his new theory to his advocacy, and to the sagacious penetration of the learned correspondents of the NATURALIST'S NOTE BOOK.

I am, Sir, yours, &c.,

H. H. ULIDIA.

Dromore, September 4th, 1867.

Short Notes.

THE CUCKOO.—Every fact illustrative of the peculiarities of the cuckoo is interesting to the lover of nature. An instance has recently occurred which I imagine to be unusual, where a cuckoo's egg was deposited and the young bird reared in the nest of a wagtail, in a conservatory attached to Tidmarsh House, the residence of John Hopkins, Esq. The wagtail's nest was built in the thick foliage of a passion-flower climbing a wall at the back of a conservatory. I saw the overgrown nestling swelling himself out and ruffling his feathers, on the 23rd of June. During the week he shifted his quarters, and took flight on the 30th. It was not likely that the parent cuckoo, which is so shy a bird, entered the conservatory in the daytime, but that she probably took her opportunity very early in the morning; and, as the glasses were then closed, the bird must have entered through two small lights, which were left open in the front of the house, What is remarkable in the above incident is, first that the cuckoo should have become aware of the well-conceived nest of the wagtail, within the conservatory; second, that she should have had the boldness to enter an enclosed building attached to a dwelling-house, from the drawing-room of which it was only separated by glass doors. It is singular in these days when the love and observation of nature so extensively prevail, that we have so little new information regarding disputed and doubtful habits of the cuckoo. We know not with certainty whether she sometimes conveys her egg to the nest of the bird she intends to victimise, in her mouth; for although instances, such as that which is recorded about a wren's nest in the September number of the *Naturalist* for 1854, seem to prove this, the proof is not corroborated. Nor again, do we know certainly whether the cuckoo occasionally assists in feeding her young one, although it seems probable from what has been asserted on this point; nor again are the attempted explanations sufficiently satisfactory wherefore the cuckoo adopts the parasitic method of rearing her young. We may ascribe the singularity to one of the freaks in which nature delights, still these vagaries may usually be traced to some physical cause or necessity, which, as regards the parasite cuckoo, has not become apparent. I cannot but imagine myself, from the mysterious and unobserved way in which the cuckoo manages her operations, and from the seeming passiveness with which the birds she victimizes become reconciled to the intrusion, that the cuckoo may possibly, like some other animals, exercise a certain power of fascination over her victims which induces silence and acquiescence. I further believe that the peculiarly shaped nostril of the bird may be the organ given by nature to assist in the discovery of a foster parent, and a nursery for her future progeny.—*Land and Water*, Sept. 7.

THE THUNDERSTORM OF AUGUST 19th—20th—It is very remarkable that this storm occurred exactly a week behind a spell of deluging rain in the United States, from the Maine frontier to the Rocky Mountains. According to a Washington correspondent to one of the papers, people began to think about furnishing steam arks. Railways were washed away, rivers overflowed their banks, a vast extent of land was inundated; great damage to property and to standing crops ensued everywhere. At Washington six inches of water fell during the 98 hours ending at noon on Sunday, the 18th, the day preceding the occurrence of the storm in England. At Albany, in New York State, and at other places, the showers were attended by various phenomena—small shells and portions of decomposed tropical plants, with gelatinous matter, being found in the pools caused by the rain. In several of the Southern States the crops were very seriously injured. It is obvious that the great Atlantic Telegraph might warn us of many an impending storm by announcing daily the state of the weather in America. The consideration of the following facts will show the utility of this suggestion. Let us suppose, for example, the northerly current to be prevailing in America, and the southerly one in Europe; the latter will have a tendency to swerve from the point of contact, and allow the former to encounter it as a north-west wind. If, on the other hand, the northerly current is in Europe, and the southerly one in America, the latter will have a tendency to impinge on that from the north in a more westerly direction than that of its original course. This effect will be caused by the greater density of the polar current in the upper regions of the atmosphere. If, however, the polar current makes too great a resistance, a whirlwind will be produced in the equatorial current in the direction S., E., N., W. If we knew the weather that prevailed in the rest of the globe—as we may, certainly, by means of all the telegraphs—we might prognosticate that which might be expected. We ought to know, when the barometer is low with us, whether the cold is intense in America or in Asia. If in America, then the west winds will bring rain; if in Asia, the east winds will bring cold. Such a matter-of-fact method would be invaluable to all who are exposed to loss by sudden storms of wind or rain.—A. S. in *Gardener's Chronicle*, Sept. 7.

THE GULF STREAM.—It is undeniable that the influence of the Gulf Stream is felt through a large part of the North Atlantic Ocean, on the western shores of Great Britain, and still further along the northern and north-eastern coasts of Europe. What is the origin of this influence? This practical question has been answered in a variety of ways, by different writers. It seems to have been taken for granted that the Stream rises in the Gulf of Mexico, and hence it is commonly called the Gulf Stream. It is generally supposed that the most, if not all, of its striking peculiarities originate in that quarter of the Atlantic. On the coasts of Cornwall, Ireland, Scotland, Greenland, and yet further north, traces of tropical vegetation are found, which are supposed to be thrown on the beach and lodged among the rocks by the northern and eastern flow of the Gulf Stream. The western slopes of this part of Europe are clothed with moisture and peculiar verdure, in consequence of the steady deposit by the south-west winds from the sea of the fertilizing and warming vapours which abound where the Gulf Stream flows. A similar result is produced off the coasts of

Florida, South Carolina, North Carolina and Georgia, in the southern portion of the United States. It extends, at certain times, along the shores of New Jersey and New York, and is more slightly perceptible all round the extreme maritime regions of New England. We say at certain times, because there are periods on the sea-coasts of Europe as well as America when the course of the Gulf Stream is carried further away from shore than it is at others. During these periods, the effect produced on contiguous vegetation is at once perceptible ; a change soon takes place in the surrounding atmosphere ; so that all things under its influence are made to feel either the presence or absence of this extraordinary agent of the sea and air.—From *The Broadway*, No. 2.

TREES OF MISSOURI.—Professor Swallow, of the Missouri Geological Survey, gives the following actual measurements of large trees in South-east Missouri :—"The largest is a sycamore in Mississippi County, 65ft. high, which two feet above the ground measures 43ft. in circumference. Another sycamore, in Howard County, is 38½ft. in diameter. A cypress in Cape Girardeau County, at a distance of one foot above the ground, measures 29ft. in circumference. A cottonwood in Mississippi County measures 30ft. round, at a distance of six feet above the ground. A pecan inthe same country is 18ft. in circumference. A black walnut in Benton County measures 22ft. in circumference. A white oak in Howard County is 26ft. in circumference. A tulip tree (poplar) in Cape Girardeau County is 30ft. in circumference. There is a tupelo in Stoddard County 30ft. in circumrerence. There is a hackberry in Howard County 11ft. in circumference. A spanish Oak in New Madrid County 26ft. in circumference. A white ash in Mississipi County is 16ft. in circumference. A honey locust in Howard County is 13ft. round. There is a willow in Pemiscot County that has grown to the size of 24ft. in circumference and 100ft. in height. Mississippi County boasts of a sassafras that must be king of that tribe ; it measures 9ft. in circumference. There is a persimmon in the same county 9ft. in circumference. In Pemiscot County there is a dogwood 6ft. in circumference. In Mississippi County Papaws grow to a circumference of 3ft., and grapevines and trumpet creepers to a circumference of 18in. to 22in.

THE DEAN IN DIFFICULTIES.—White mice are used to feed the snakes at the Zoological Gardens. When the ladies see a white mouse in a cage with a snake, they say, "Poor little white mouse. How cruel." Sometimes when white mice run short, the snakes are fed with common mice, and then the ladies say, "Oh, its only a common brown mouse, the nasty thing !" I lately heard a capital story of a brown mouse. A certain dignitary of the Church is remarkable for a profusion of snow-white hair, which gives the worthy old man amost venerable aspect. One day, when out for a walk, he fancied he felt something moving in his hair, quite at the back of his head. This object he in vain tried to catch, but was unable so to do until he arrived home ; when to the horror of all, it was found that a brown mouse had actually had the audacity to take up his quarters in the decanal hair, and from whence it required some hunting to dislodge the little rascal. What the object was on the part of the mouse in taking up his curious place of abode we know not. Possibly, however, this mouse was deputed by the mice of the adjoining church to go to the Dean and make a formal complaint of their proverbial poverty. The Dean, being a kind-hearted man, they thought might take their case into consideration. We have heard of a "bee in a man's bonnet," but never until a few days since of a "mouse in a Dean's hair.—FRANK BUCKLAND in *Land and Water*, Sep. 14.

BLACK RAIN.—The Rev. Mr. Rust, Slains, Aberdeenshire, writes to a Contemporary regarding this matter as follows :—"It has again turned out, as it did uniformly on all former occasions of known black-rain showers in Slains and Aberdeenshire, or Carluke and Birmingham, that one of the Italian volcanoes has been at work contemporaneously with the last Slains showers. On this occasion, as most usually, it has been Vesuvius. 'Vesuvius,' says a foreign Correspondent, 'which has for the last month been throwing up sheets of flame and smoke, has now subsided into a dormant tranquillity.' As I wrote you last in haste, I had not time to verify another black shower, which fell at Slains, &c., on Thursday, the 27th of September last, at seven p.m., and therefore I did not allude to it in my last communication with you. But it has since been verified ; and my general remarks passed on the others are applicable to it. Now do we know of fourteen black showers, and all of them connected by contemporaneousness with Vesuvius or Etna. And what else is it but contemporaneousness that proves the connection between the tides and the moon, the effects and their cause ? If we are satisfied with the sufficiency of proof in the one case, we are bound to be so in the other."—*Elgin Courant.*

A WONDERFUL EGG.—The following is from the *Journal de Toulouse*:—"M. Nau, a rich merchant of the island Le Réunton, who has remained 13 years a prisoner among the Hovas, has just brought to Toulouse an egg as remarkable from its size as its extreme rarity. It was found by M. Nau in the recent alluvial deposit of Madagascar at a depth of 4½ feet ; it appertains to a bird of the ostrich kind, but of a size much greater, even exceeding that of the *dinornis giganteus* of Australia, which however attained a height of more than 11 feet The egg in question is a perfect oval ; it measures one foot in its longest diameter and 10 inches the transversal one; the thickness of the shell is about 3-16ths of an inch ; the colour yellowish white. In 1850 M. Abadie brought two similar ones to Paris from Madagascar, which were made the subject of an interesting notice by M. Geoffroy-Saint-Hilaire in the *Comptes-Rendus* of the Institute in 1851. The illustrious academician attributed to the animal, at present extinct, which laid these eggs, the name of *acpyornis* or tall bird. In fact, to judge from some fragments of bones which belonged to it, the *acpyornis* could not be less than 12ft. high. Some scientific men have expressed the opinion that this gigantic bird has perhaps still some living representatives in the interior of Madagascar, but M. Nau, who has traversed the island in every direction, affirms that is not so. The Malgaches themselves regard it as a species entirely destroyed.

CURIOUS CHICKENS.—A favourite hen of the Dorking breed was accustomed to lay its eggs in a pigsty, but day by day the eggs were carefully removed for fear of the pig devouring them. At length the hen began to show the usual signs of incubation, and as she went clucking about the sty, the proper proprietor produced a litter of pigs. Instantly the hen became possessed with a notion that the adoption of this strange progeny would satisfy her maternal craving; consequently she took possession of them, spread her wings over as many of them as she could gather under her, and fluttered about in a state of joyful excitement. This she continued to do for nearly three weeks, until the poor hen was nearly stripped of feathers, from the little pigs poking and rubbing in and out between her wings, and very nearly exhausted. It was a very curious sight to see her hoisted between two of her progeny, or a little later, seated on one of their backs, frantic with apprehension, as they rushed round the sty in the enjoyment of their different gambols, utterly regardless of the frightened clucking of their adopted mother. This occurrence frequently took place in the presence of visitors, who were invited to witness it. The hen was eventually removed.—*People's Magazine*, Sept.

NEWLY IMPORTED SPECIES OF INDIAN POULTRY.—The Peegum Pilly Gaguzes is a species of poultry which Captain Hastings Fraser has brought from Central India, and which he intends to naturalize in Scotland. The cock stands 2ft. 6in. upright, and is a noble bird; his thigh is so big that it can hardly be spanned with one hand; his eagle-like eye and mighty feet are also worthy of remark. The chickens are of extraordinary size and character, and are probably near relations of the Malay and Culm fowl. We understand that, by the last mail, seventeen of these fowl left India, and, with the exception of three chickens, they all arrived safe and in good condition. The great recommendation of this species for breeding is the quantity of flesh which they carry, young birds seven and eight months old weighing as much as 8lb. The Mohammedan Patans of India are very jealous of parting with their breed of poultry, but the native gentlemen or petty chieftain, from whose family these birds take their name, presented a few of them to Captain Fraser, and that officer has brought them to England with the intention of crossing them with Dorkings.—*Illustrated London News*.

GEOLOGICAL CURIOSITY.—A great geological curiosity has just been deposited in the museum of the Hartley Institution, at Southampton, consisting of a piece of flexible stone about 2ft. long, 7in. wide, and more than 1in. in thickness, having the appearance of rough sandstone, which bends with slight pressure like a piece of India-rubber or gutta-percha of the same size. This very interesting specimen of Geology has been placed in a glass case constructed for it, fitted with a lever, by touching the key of which on the outside of the case the flexibility of the stone is shown. It was presented to the Hartley Institution by Mr. Edward Cushen, from his relative, Mr. R. S. Munden, who obtained it from Delhi, in the East Indies. In its natural position the stone is said to run in thin layers in the soil in which it is found, but is so rare in India that it finds a place in the museums at Calcutta. We hear that there is a similar stone, but not so wide as the one under notice, in the British Museum, and another in the museum of the School of Mines, but specimens are very rarely to be met with. Although the stone has a gritty appearance, no grit or dust is thrown off by the motion given to it when under pressure.

THE SENSITIVE PLANT.—In a late number we (*London Review*) alluded to some experiments on the sensitive plant which had been conducted by M. Bert. The subject has now been taken up by M. Ch. Blondeau, who has been experimenting on the leaves with the induced galvanic current of a Rhunkorff's coil. He submitted three plants to the influence of the electric current. The first was operated on for five minutes; the plant when left to itself seemed prostrated, but after a while (a quarter of an hour), the leaves opened, and it seemed to recover itself. The second was acted on for ten minutes. This specimen was prostrate for an hour, after which it slowly recovered. The third specimen was galvanized for twenty-five minutes, but it never recovered, and in twenty-four hours it had the appearance of a plant struck by lightning. A fourth plant was etherized, and then exposed to the current. Strange to say, the latter had not any effect, the leaves remained straight and open; thus proving, says M. Blondeau, that the mode of contraction of the leaves of the sensitive plant is in some way allied to the muscular contraction of animals.

RICE GROWING IN JAPAN.—Two Japanese botanists have communicated a very interesting paper to the Acclimatisation Society; Tanaka and Yekoossina are the names of these gentlemen. In Japan, it appears, they have accustomed rice to grow without remaining swamped in water; by dint of great patience, and by gradually diminishing the supply of water, they have got what they term dry rice, and after a few crops this rice appears to lose its old nature and to be able to get on in dry soil. In the district of Jeddo, the fields that are to be sown with rice are well manured towards the end of March or the beginning of April, and then ploughed. Before sowing, the rice is macerated in water for three days and three nights; it is then exposed to the sun in order to hasten its germination. After picking out the bad grain, the rest is mixed with ashes and the remains of fish, dried, and reduced to powder; the mixture is then strewed along the furrows, which are immediately afterwards filled up with earth. This operation takes place in May. If the weather is very dry, the field must receive liquid manure. In the course of June and July the field must be weeded and the roots earthed up; an abundant crop may then be expected in October or November. This system of tillage is practised in Japan also for wheat and other grain.

CENTAUREA BABYLONICA.—We read in the *Gardener's Chronicle* of Sept. 7th:—No collection of hardy fine-leaved plants—no place where sub-tropical gardening is attempted, should be without this. The flowers are poor and yellow, so much so that they would be better out of sight; but nothing can be more distinctly noble than the great silvery leaves when the plant is in good soil. It is thoroughly hardy. The stem rises to a height of 8 or 10 feet when the plant is in good deep loam, and in any soil it is large. The inflorescence assumes a pyramidial outline, looks like a slender pyramid of yellow, in fact, and those with no objection to comparatively poor-looking yellow flowers may let it flower, but generally it will be found better to pinch out the stems in their earliest infancy, and thus encourage a grand growth of leaves. I have a slight objection to any plant that requires pinching or any other attention to make it assume the character we admire, but this is really so distinct and fine that we must admit it to the front rank of hardy fine-leaved plants. Of course it would prove fine for the group of hardy fine-foliaged plants, its immense silvery leaves contrasting finely with the glistening green ones of the Acanthus and other good green things, which I hope to soon see used in this way.

HOW NATURE PRESERVED A RECORD.—A St. Louis paper mentions an incident which occurred in the surveys of the Iron Mountain Road in the cypress swamps of South-east Missouri. The engineers, having orders to locate their surveys in connection with the United States land surveys, had occasion to search for marks or records made years ago in the swamps. The land surveyors had marked the results of their work by cutting into the body of a tree, levelling off a smooth surface of the trunk, and engrossing their records on the tablets thus prepared. The engineers found the trees of the old survey, and recognised the scars of former cuttings, but to reach the records were compelled to cut into the trees again. New wood had grown up over the old record, completely hiding and protecting it. But, after cutting into the body down to the original tablet, they found the surveyor's record as plain and distinct as when first made.

THE HEN A TACTICIAN.—Hens often display a great deal of cunning and sagacity in the attainment of their objects. A clergyman related the following little anecdote to the writer. During the severe weather last winter he was accustomed to feed the small birds with grain and crumbs of bread; but his success was much marred by the depredations of a hen, whom he had the greatest difficulty in keeping from the food. He tried to effect this by throwing stones at her, till one morning her instinct directed her to try the following expedient. She found that by getting behind a tree, where she could neither be seen by the clergyman nor hit by his missiles, she was able suddenly to shoot forward, pick up a bit, and escape to her hiding-place, before a stone could reach her. This she did for several days, until her hiding-place was discovered and she was driven from her place of security.—*People's Magazine*, September.

STORY OF A DOG.—On Sunday morning, October 28th, the house and outbuildings, with their contents, of Alderman Block, of Fredericton, N.B., were consumed by fire. The *Colonial Farmer*, published in that city, gives the following incident, which is worthy of record, as showing the fidelity of this noble animal:—"It seems that the fire was first detected by a Newfoundland dog, the property of Mr. Block. The noble brute, with almost human instinct, tore his way into the house by means of one of the doors, and aroused the family by his barking, and then ran to the stable door which he endeavoured to open so that the horse, his almost inseparable companion, might escape. There he remained struggling, though every effort was made to entice him away, and when the fire went out he was found lying dead at his post." A correspondent states that the dog effected an entrance to the house by tearing out a panel of the door with his claws, and thus saved the lives of the inmates, who had time to retire, but not time enough to save anything.

THE PHOSPHORESCENCE OF THE SEA.—"An Observer," writing form Strone, says,—On Sunday night last, about ten o'clock, there was one of the finest exhibitions of phosphorescence visible from Strone and the surrounding watering places we have ever witnessed. An east wind produced short, deep waves, and every crest as it broke became vividly illuminated, the surface of the sea gleamed for miles around, and so brilliant was the light that it made the darkness perceptibly less along the coast, like the stars on a clear moonless night. Those who have seen the phosphorescence in this country only were afforded some idea of its appearance in more southern latitudes, where the warmer climate allows the lower forms of marine animals to develop in greater profusion; and as some of our Glasgow naturalists have been lately examining these phosphorescent animals, they have now an excellent opportunity to prosecute their researches further.—*Standard*, Sep. 5.

FUNERAL OF A BEE.—A correspondent of the *Glasgow Herald* transmits the following:—"On Sunday morning last I had the pleasure of witnessing a most interesting ceremony, which I desire to record for the benefit of your readers. Whilst walking with a friend in a garden near Falkirk, we observed two bees issuing from one of the hives, bearing betwixt them the body of a defunct comrade, with which they flew for a distance of ten yards. We followed them closely, and noted the care with which they selected a convenient hole at the side of the gravel walk, the tenderness with which they committed the body, head downwards, to the earth, and the solicitude with which they afterwards pushed against it two little stones, doubtless 'in memoriam.' Their task being ended, they paused for about a minute, perhaps to drop over the grave of their friend a sympathising tear; and then they flew away."

DISCOVERY OF A CAVE IN A LIMESTONE QUARRY.—As some men were at work blasting in one of the Fulwell quarries, a day or two ago, they discovered about a depth of 60ft. below the top of the limestone bed, a natural cavern, the roof of which subsequently fell in and filled it up. The cave had evidently been at one time a receptacle of water, as its sides were in places worn away by the drip. It had been dome shaped, 30ft. in diameter, and about 20ft. in height, and it is on a level into what is known as the "fish bed," and the locality from which many interesting fossils of extinct fish have been obtained.—*Newcastle Journal.*

Remarks, Queries, &c.

(*Under this head we shall be happy to insert original Remarks, Queries, &c.*)

THE BARK OF TREES.—This subject, I think, has not been sufficiently studied as a character either by naturalists or arboriculturists. Any one possessing only a moderate knowledge of trees could easily determine most of them by a mere glance. I will only mention the birch, beech, oak, and Scotch fir, and your readers can satisfy themselves that it is so. No tree has a more beautiful bark than the birch. When young it is of a silvery white colour. As it grows older it assumes a totally different character. Every bit of silver is gone, and cracked off the lower part of the tree; but upon the upper part it still flourishes as before. The smooth bark of the beech needs little illustration. Unlike the birch, which, although silvery in youth, becomes rugged and deeply corrugated in age, it retains the same appearance to extreme old age, although then the trunk assumes all sorts of humps and protuberances. The bark of the oak has the same character all over, except on the small twigs. It is closely and longitudinally furrowed, and the only difference is, that the smaller the branch the finer the corrugations. The appearance of the bark of the Scotch fir is different in different parts of the tree. At the lower part of the tree it is deeply and longitudinally furrowed, and the spaces between the furrows scale off more or less in large, long, irregularly oblong patches. Higher up, the scales are smaller and not so long. J. D. S. W.

RATS ON THEIR RAMBLES.—A writer (Martin, I think, in his "Tour to the Western Isles"), says that about the year 1700, the ancient race of the Island of Rona was destroyed in the following almost incredible manner:—"First, a swarm of rats, none knew how, came into the island and ate up all the corn. In the next place, some seamen landed and robbed them (the people) of what provisions they had left, and all died before the usual time of the arrival of the boat from Lewis!!" This presumed incursion of rats tries the most elastic credulity. Can any of the correspondents of the NATURALIST'S NOTE BOOK throw any more light on this curious subject?

Dromore, September 5th. H. H. ULIDIA.

HOW TO PRESERVE MILK.—When milk "turns," this effect is caused by the development of an acid in the liquid. This chemical change may be effectually prevented by adding to the milk a small quantity of bi-carbonate of soda. This addition is by no means injurious to health; on the contrary, bi-carbonate of soda aids digestion. One of the great dairies of Paris employs no other method but this for preserving the milk it keeps for sale. J. D. S. W.

HYDROPHOBIA IN DOGS.—Most persons are of opinion that this distemper is caused solely by extreme heat of weather. Others say that this is not the case, but that it is produced by the influence of the "dog-star." This disease is hardly known in tropical countries. Our newspapers, also, record as many cases in winter as in summer. Will any of your scientific readers give their opinion as to its cause?

R. W. B.

FOREST TREES.—Can you, or any of your readers, favour me with a list of "forest trees" which are natives of Britain? and let me know the best book of botany for beginners? R. W. B.

STATE OF THE WEATHER NEAR LONDON.

August and Sept.	Moon's Age.	Barometer.		Temperature.					Wind	Rain.	Remarks.
				Of the Air.			of the Earth				
		Max.	Min.	Max	Min	Mean	1 foot deep	2 feet deep			
Thurs. 22	☾	30.049	29.998	73	48	60.5	65	62	S.W.	.00	Fine; very fine; clear at night.
Friday 23	23	30.051	30.009	75	49	62.0	64	62	W.	.00	Cloudy; exceedingly fine; clear, with starlight.
Satur. 24	24	30.088	30.038	74	55	64.5	64	62	S.W.	.00	Fine; very fine throughout.
Sunday 25	25	30.027	30.003	75	57	66.0	64	61	S.W.	.00	Cloudy and hot; very fine; overcast at night.
Mon. 26	26	29.971	29.956	69	48	58.5	62	60	N.E.	.14	Overcast; heavy showers; slightly overcast; rain.
Tues. 27	27	30.040	30.000	67	48	58.0	62	60	N.W.	.00	Partially overcast and fine; overcast; cloudy at night.
Wed. 28	28	30.118	30.088	70	51	60.5	62	60	S.W.	.00	Fine; cloudy; clear and fine at night.
Thurs. 29	●	30.150	30.088	72	48	60.0	62	60	S.	.13	Cloudy; very fine; cloudy at night.
Friday 30	1	30.084	29.924	73	49	61.0	63	60	S.	.00	Fine; exceedingly fine: clear at night.
Satur. 31	2	29.858	29.812	78	65	71.5	63	60	S.E.	.00	Fine; exceedingly fine; overcast.
Sunday 1	3	29.919	29.818	80	45	62.5	65	61	S.E.	.00	Overcast; very fine and hot throughout.
Mon. 2	4	30.072	30.041	78	59	68.5	64	61	S.E.	.20	Very fine; clear and fine throughout.
Tues. 3	5	29.982	29.868	74	53	63.5	65	61	S.E.	.22	Violent thunderstorm and heavy rain, 6. A.M., warm and overcast; low fog at night.
Wed. 4	6	29.835	29.807	74	54	64.0	64	61	S.W.	.10	Overcast; cloudy; clear and fine at night.
Thurs. 5	☽	29.821	29.798	73	42	57.5	63	61	W.	.02	Rain; fine; clear, and very fine at night.
Friday 6	8	29.773	29.725	69	52	60.5	62	61	S.W.	.12	Fine; heavy showers; fine.
Satur. 7	9	30.000	29.851	72	40	56.0	63	60	S.W.	.00	Overcast; fine; clear at night.
Sunday 8	10	30.030	29.848	73	40	56.5	62	60	S.	.00	Very fine; cloudy; very fine.
Mon. 9	11	29.856	29.731	74	50	62.0	62	60	S.W.	.82	Very fine; excessively heavy rain.
Tues. 10	12	29.887	29.785	73	41	57.0	62	60	S.W.	.30	Clear; fine; thunder and heavy rain, 5 P.M.; clear.
Wed. 11	13	29.941	29.854	72	56	64.0	62	60	S.	.21	Hazy; cloudy; overcast; rain at night.
Thurs. 12	14	29.877	29.694	73	46	59.5	62	59	S.W.	.00	Rain; fine; very clear and fine at night.
Friday 13	15	29.997	29.903	70	42	56.0	62	60	W.	.00	Slight haze; overcast; very fine.
Satur. 14	○	29.996	29.858	66	40	53.0	62	59	S.W.	.04	Fine; rather boisterous; rain at night.
Sunday 15	17	30.086	29.983	70	40	55.0	61	59	N.W.	.00	Cloudy; fine; clear and very fine.
Mon. 16	18	30.194	30.124	66	36	51.0	60	59	N.W.	.09	Clear; partially clouded; clear at night.
Tues. 17	19	30.317	30.291	61	46	53.5	60	59	N.E.	.08	Overcast and cold; clear and fine; overcast; rain.
Wed. 18	20	30.320	30.209	68	49	58.5	60	58	N.E.	.00	Cloudy; clear, with scattered white clouds; cloudy.

SHARKS.

FROM the equator, east of the Cape, up the Indian Ocean and the Bay of Bengal to where the opaque muddy water marks the region of the "Sand Heads," sharks abound. They are numerous about the Mauritius, off Ceylon, and the Coromandel coast; about the islands in the Bay of Bengal, the Andamans, Cocoas, Narcondam, Nicobar, and all along the Arracan and Burmese coasts, to the S. E. Archipelago, they swarm. In the Calcutta river and the numerous streams and creeks of the Soonderbuns they are perhaps as plentiful; but the turbid waters of the upper parts of the bay conceal them from view. This I saw strikingly illustrated shortly after our entrance into the Hooghly. We had anchored, the tide failing us, off Saugor island, a hideous mud flat, crowned with jungle grass and scattered over with a few wretched buildings; and, while waiting there five weary hours for the flood to make, employed ourselves watching the usual sights that greet the new arrival in Bengal—the gulls, crows, and Braminy kites flying about the ship; the canoes and strange country boats of the natives gliding along by the shore, in the rapid ebb tide; the ghastly bloated corpses, some surmounted by a crow or a vulture, floating down the muddy stream—till, sated with the spectacle, we began to wonder we had seen no crocodiles or sharks, for which the place had an ill fame. Not a living thing appeared to inhabit that filthy water, and, after venting our disappointment thereat, and coming to the conclusion that nothing worth looking at—certainly no sharks—frequented the river, we remained listlessly leaning over the ship's side, smoking our cheroots, and wondering what made the Hooghly so like *café au lait*, when from the gallery forward the butcher threw overboard the entrails of a sheep he had killed and prepared for the cook's functions. We looked at the offal in an idle, uninterested way, as, borne by the ebb, it swept rapidly aft; but hardly had it reached the ship's quarter, just underneath us, when we saw it violently agitated, and then torn and snatched by some six or eight broad shovel heads and grinning jaws, and the water around lashed by angry tails and fins! We started back in amazement. The supposed tenantless stream was absolutely swarming with sharks, prowling close around the ship, but in such thick and foul water as to be invisible till lured to the surface! Strange to say, notwithstanding their numbers, a shark is seldom, if ever, caught in the Hooghly by hook and line.

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There are many species of sharks, some so like each other as only to be distinguished by a close examination of their scales or of their teeth. Some, similar in form, are widely opposed in habits. The ordinary sharks will not go near broken water; but the species found on the Coromandel coast come right into the surf, and have been known to seize men wading little above their knees. The small ones are eaten by the poorer Chittagong Bengalies, Arakanese, Burmese, Talaïngs, Siamese, and Malays; and immense quantities of their fins are exported to China, to be made into a rich glutinous soup, of which the Celestials are very fond. I have been informed, but I know not if correctly so, that sharks are unknown in the China Seas. At Hongkong, certainly, natives and Europeans bathe anywhere in the harbour without the slightest fear.

It is only the largest sharks, however, which will attack men. Such are mostly the solitary fishes, which keep during the day far out from shore, lurking at the bottom; sometimes in calm weather coming up to look at a fisherman's boat, and during the night approaching the beach.

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The hammer-headed shark (Zygœna) is a common enough species on the eastern side of the Bay of Bengal. They are found in the same haunts as the common shark, but appear to keep more constantly to the bottom. There is nothing peculiar in their habits answering to the singularity of their form, unless we place credence in my old Malay friend's assertion, that in swimming slowly past rocks the zygœna pokes his projecting eye into the crevices, to spy out the crabs which lurk there, and on which it feeds. But a practical objection to this theory is, that such discovery would be in each case useless to the fish, which could not get its mouth in where the eye had penetrated; so that, unless the crab were a fool and waddled out of his retreat, he would be none the worse for his whereabouts being discovered. The hammer-headed sharks haunt the coast; the largest (which range up to 12 or 13 feet) keep furthest out, but never beyond five or six miles from the shore, in 20 or 30 fathoms water.

Vast numbers of sharks, generally of small size, are taken by Bengalese, Burmese, and Malays, in nets, and in what the Burmese call "damains"—rows of stakes and mats placed so as to form labyrinths, in which fish of all kinds congregate without finding their way out again. Large sharks are a great nuisance to the fishermen if they get in their nets, as they will bite through several folds, and tear them with the lashes of their tails, before they can be put *hors de combat*. The Arakanese, in their small fishing-boats, go boldly in pursuit of these fishes, which swarm about the bar of Akyab River.

They try for them with a line and hook baited with fish, and when a shark has taken the bait they let him run about as long as he likes, towing the boat after him. When his efforts begin to slacken, another boat joins the first one, and the two are lashed together side by side. The shark is then gradually pulled in, and his head hoisted out of the water, or brought into a convenient position to receive a tremendous blow with a *dá* (a large heavy knife or cleaver). Fresh water is then poured into the wound (a process which the Arakanese say is immediately fatal), and the fish is towed to shore or the nearest market.

I have alluded to the shark's singular companions, the pilot fishes. Their apparently unnatural attachment to the former has never, to my knowledge, been satisfactorily accounted for. The pilot fish (*Naucrates ductor*) is of the mackerel family, and there is nothing in its conformation to explain its eccentric departure from the manners and customs of its kith and kin. It is a widely-spread little fish, being found in all the seas of the temperate and tropical regions. It keeps well out to sea, and only approaches the shore when attracted by ships making for the land, for it has a propensity to follow ships as well as sharks.

The sucking fish (*Echeneis remora*) is also another well known *attaché* (literally speaking) to the shark. It adheres to the latter by the crown of its head, and suffers itself to be thus carried along for immense distances, often being drawn upon deck sticking to the shark's body. It adheres to rocks in the same manner in rapid tideways, and thus preserves its position without effort in the wash of the waves.

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As I said before, none but the largest sharks will attack man, and even the very largest can be frightened away by splashing and making a great hubbub in the water. It is probable also that there must be considerable pressure from hunger before they will act on the offensive ; and this may account for the very few casualties which occur, even where these fishes are known to be numerous. I once swam about the harbour at Point de Galle, in Ceylon, for a considerable distance, utterly unaware at the time that it was full of sharks. I need hardly say I did not see the smallest indication of one. In 1843, I was informed by an officer whose acquaintance I made at Singapoor that he and other officers of the regiment stationed at Kyoukphyoo, in Arracan, were in the constant habit of bathing in the harbour there, and that not the least alarm had been caused by a shark within the memory of any one at the station until quite recently, when an officer, who had swum a considerable distance from the beach, was seized by one, and so dreadfully bitten in the thigh that, although he was brought to shore by his comrades (who swam to his assistance in the most gallant manner), he died from loss of blood in a few minutes. In the night these dreadful fishes seem to be bolder, or perhaps are more "on the feed," of which my informant gave me the following proof.

One day during the rainy monsoon of 1842 three men of the Arracan local battalion at Akyab deserted, and smuggled themselves on board a native boat which was about to cross the harbour late in the evening. The weather was dark and stormy, and when the boat reached about half-way across—that is, nearly three miles from either shore—in a tumultuous sea, caused by the race of the tide against a strong wind, the boat capsized. Its occupants got on her bottom, but there being no keel or anything to hold by, were frequently washed off, and helped on again by their companions. All were good swimmers and strong hardy men, and as there was a good chance of the boat being drifted on to some rocks just visible in the darkness, they kept up good heart, till suddenly one of their number (a sepoy), in struggling to regain his place on the boat's bottom, gave a loud shriek and disappeared ! Horror seized upon the party, for the Arakanese are all more or less fishermen and boatmen, and long experience in the dangers of those waters at once informed them of the nature of their comrade's fate. They knew the sharks which swarm about that part of the harbour were collecting round the boat, and with this dreadful conviction they lay desperately clinging to the slippery surface of the canoe, fully aware that to slip into the sea was to meet a speedy but frightful death. Not many minutes elapsed before another unfortunate sepoy startled them with a ghastly yell. A few broken words, while he clung to the boat, explained his awful situation; and, with a frantic clutch or two at the slippery bottom, and at his companions, who were powerless to help him, he was swiftly drawn under. The miserable survivors, stupified with terror and bereft of hope, lay still upon their rolling and insecure perch, till they had providentially been carried past the strength of the stream, where the tumbling waves had pitched them incessantly off their seats, and, entering a smoother space of slack water, were enabled to guide the boat to a rock, and there to right her and proceed on their way.

But these horrible occurrences are rare. Fortunate indeed, for those whose avocations call them into tropical seas, is the capricious nature, the timidity, the sluggishness, or whatever it may be, which in nine cases out of ten deters the shark from attacking a man in the water. I have seen at Penang and Singapoor the Clings or Madras fishermen wading up to their necks, dragging their nets along by the shore; and, though they pass many hours of almost every day in the year thus occupied, not a casualty from sharks has ever been known to occur amongst them.

The size attained by sharks has been doubtless much exaggerated, and the accounts we now and then meet with of the capture of a monster out at sea, or in the West Indies, bear too much the semblance of romance, or at least of heated fancy, to be received as a correct record of facts. Moreover, these accounts are generally by unscientific persons.

Of fossil sharks there are teeth to be seen in many cabinets and museums; by which, assuming that the teeth were in the same proportion to the entire bulk as they are in the sharks of the present day, their paleontological (or paleogonous ?) owners must have been 50ft. long. In the museum at the Cape of Good Hope I saw a shark's jaw (a donation of no long anterior date, by the captain of a vessel, the name of which I regret not having taken a note of), which measured 21in. from the symphisis of the upper jaw to that of the lower, and 15in. across at the gape. This fish, therefore, allowing him to have been of the usual proportions of the ordinary deep-sea shark of the Pacific and Indian Ocean, must have been 19ft. or 20ft. long, and 11ft. in girth at the shoulders.—*Field*, September 28th and October 5th.

NATURALISTS' FIELD CLUBS.

It is manifest that the successful working of a Field Club must depend on the suitability of its plans to the circumstances of its position. Field Clubs commonly belong to one or the other of two distinct classes. 1st. Such as occupy a wide field extending over a large portion of a county, and include amongst their members chiefly professional men, and men of independent position. 2ndly. Such as are established in populous towns.

To the former of these divisions belongs the Cotteswold Naturalists' Field Club, of which we need only say that the intellectual and genial character of its gatherings is such as to induce men of eminence in science, even when residing in London, frequently to attend its meetings. Its publications have not been issued regularly, but are of the highest scientific value.

The Woolhope Naturalists' Field Club has this year issued a volume of transactions, which plainly indicates the Club to be in a thriving and vigorous condition. The speciality of the work, however, mainly consists in that portion of it which contains the Flora of Herefordshire, edited by the Rev. W. H. Purchas. The Flora is accompanied by a map of the county divided into fourteen botanical districts: a schedule follows, pointing out the plants found in each district. The editor modestly disclaims originality in adopting this plan; but we do not know that it has been carried out with the same degree of completeness in any other county. The difficulty of obtaining satisfactory reports from so many districts must have been very great.

We quote from the advertisement:—"It has of late years been felt that a very imperfect view of the botany of any county was given by the plan on which the older Floras were drawn up; that plan being to mention stations for the rarer plants, or those supposed to be such, whilst it was left to be inferred that the remainder were equally common throughout the whole area to which the Flora related. The real truth being that species which, from their frequency in one part of a county, might be expected to prevail equally throughout its whole extent, are found, when specially sought after, to be comparatively local."

Whilst Field Clubs very rightly devote a good deal of attention to the geographical distribution of plants, it may be remarked that the geographical distribution of the Field Clubs themselves is a subject worthy of notice. A map of England marked with the stations of these Clubs would show them to be very unequally distributed. A belt extending from Lancashire along the western side of England to the south coast would include amongst others the following: Bath, Bristol, The Caradoc, The Cotteswold, Cheltenham, Dudley, Exeter, Liverpool, Malvern, Manchester, Oswestry, Preston (1867), Severn Valley, Somersetshire, The Teign, Worcestershire, and The Woolhope. In the rest of England the stations marked would be comparatively few and far between. Are we to apply to the geologists or the ethnologists for an explanation of this?

The list of Herefordshire plants is a large one: some of the districts, particularly that of Ross, have been fortunate in possessing a representative not afraid to attack such formidable botanical problems as the Willows and the Brambles. A list of plants, however, even if it were perfect, would convey but little instruction unless connected with information respecting the physical and geological features of the district to which it belonged. This want has been supplied by the Rev. W. S. Symonds, President of the Malvern Club, who has given an admirable account of the local and geological characters of each of the fourteen subdivisions of the county. It is announced that a future portion of the Flora will consist of a "more detailed mention of the different plants, and will give any further information that may seem needful." The volume contains full reports of the excursions, referring to which Dr. Bull, the President, in his retiring address, remarks, "The published reports of our field days make people wish they had been with us." Not the least doubt of it! Who would not wish to share in such *dies ambrosianæ*, with salmon and the goodly haunch of venison on the board, and such men as Bentham (of the Handbook) and Brodie and Symonds as guests, besides the members of the Club, around it?

Before leaving the Woolhope proceedings we must refer to the series of photographs of remarkable trees in Herefordshire: these are not the only indications that this Club gives more than common attention to the subject of trees, too often almost neglected by botanists.

The Bristol Naturalists' Society differs from most others in having distinct sections for entomology, chemistry and photography, zoology, botany, and geology. A general meeting is held once in the month; the sections also have monthly meetings and excursions, and contribute funds to the library of the Society.

The Liverpool Naturalists' Field Club professedly aims at the extension of a taste for natural science, and seems to have ample scope for its efforts amongst its 720 members. Some peculiarities in its plan are thus noticed by the President:—"As the plan of giving prizes (books on natural history subjects) originated with our own Club, I may state that practically it has been found very successful. Many younger members of the Club, beginning with the prizes (at the excursions) most easily attainable, have been encouraged to proceed zealously with studies which otherwise would not have been entered upon; whilst some of the collections sent in for our annual prizes have far surpassed all our expectations." "Large numbers join our excursions who are not particularly interested in any branch of natural science, and this is just what the chief object of our Club renders a desirable circumstance. The busy appearance of our workers, who often come in when tea is half over, flushed with exercise and animated with success, is a suggestive lesson to others who may be found waiting at the door of our meeting room half-an-hour or even an hour before the appointed time; a lesson on the difference of the amount of pleasure afforded by a walk with a special object, and a walk without one." "Our numerical strength gives to our most valued members facilities for visiting localities at great distances, on terms which could not otherwise be obtained. We are able to engage a special train and make a journey of 160 miles in a day, at a cost, including a substantial dinner-tea, of about seven shillings each, allowing five hours for work at the locality visited."

Naturalists' Societies now in operation in Great Britain have upon their lists probably not fewer than 4,000 members: we may safely add an equal number to represent professors, students, collectors, and others not connected with any society, yet more or less actively engaged in the same pursuit. Such a company should be able to give a good account of the natural history of their own country, yet many interesting branches have been all but wholly neglected, and some are at present without even a moderately useful *Handbook*, *e. g.*, the Fresh-water Algæ, the Annelids, and the Centipedes: but even in the pursuits which are most popular much remains to be done. Members of Naturalists' Societies must be aware that a question is pending which in Zoology and Botany may open a field for investigation, comparatively, as vast as that annexed to astronomy by the invention of the telescope. Yet it is a marvel how few direct their efforts towards the acquisition of evidence for or against the hypothesis of the origin of species by natural selection. Facts well authenticated and chosen with discrimination on either side are equally, and at present pre-eminently, the desiderata of natural science.—*Quarterly Journal of Science*, Oct. London: Churchill.

GEOLOGY AND THE MICROSCOPE.

THE microscope, employed some thirty years back by Ehrenberg in the examination of minute fossil organisms, is now recognised as having already done good service to palæontology, but was quite unknown to the geologist proper until within the last few years, when the admirable labours of Sorby have demonstrated the importance of the microscope as an indispensable instrument of research in the study of physical geology and petrology, as well as indicated how much more may be expected from its more extended application.

The application of the microscope in these enquiries is as yet, however, quite in its infancy, for with the exception of Sorby's invaluable memoirs on some special points of enquiry, literally nothing has as yet been made public which could even serve as an introductory guide to the geologist who might wish to commence the study of the subject. It is therefore with great hesitation, and only after much solicitation, that the author of these remarks has now ventured into print, with the hope that by once breaking the ice, others more capable than himself may be induced to communicate the results of their researches on the same subject.

In the present communication it is not intended to go into the details of any special microscopic investigation, but, as far as the space at disposal will allow, to attempt a short sketch of some of the results already obtained, in order thereby to illustrate the use of the microscope in similar enquiries, and to place the same before our readers in as plain untechnical language as possible.

When applying the microscope to the examination of rock structure and composition, it is necessary to prepare the specimens previously, in order to be enabled to make full use of transmitted light in their investigation, since a mere inspection of their outer surface, viewed as an opaque object, although sometimes of considerable value, does not, however, give a tithe of the information which their examination by transmitted light will afford.

When in sufficiently thin splinters or laminæ, by far the larger proportion of mineral compounds allow light to pass through them with more or less facility, and amongst these, most silicates, chlorides, fluorides, carbonates, sulphates, borates, and other salts, as well as many oxides, and some few sulphides, sulpharsenides, &c. On the other hand, all native metals, alloys, and most of their combinations with sulphur, arsenic, antimony, &c., along with some few oxides and other compounds, are opaque, even when in the thinnest laminæ, and consequently when present, as they often are, in minute quantity in rocks, although sometimes recognisable by their external crystalline form, are not to be distinguished by their optical properties, as in the case of those bodies which, as before mentioned, are translucent.

When a mineral or rock under examination is entirely in the vitreous state, as, for example, obsidian, it appears when viewed under the microscope, merely as a more or less transparent or coloured glass, presenting, if perfectly in the vitreous condition, no evidence of crystalline or other structure, except perhaps traces of the striæ of viscid fusion. It is usually found on inspection, however, that some part of the mass is sufficiently devitrified to allow of its structure and mineral composition being recognised. In some cases, when the glassy appearance presented to the eye would discourage any hopes of structure being discovered, the microscope proved the reverse most conclusively.

In many cases, however, where the specimens are so perfectly in the vitreous state as to show no trace of structure whatsoever, this may be developed by carefully acting upon the surface by gaseous or liquid hydrofluoric acid.

The rock sections may be prepared for the microscope as follows: a fragment, from one-quarter to three-quarters of an inch square, and of convenient thickness, is chipped off the rock specimen in the direction of the required section, and ground down upon an iron or pewter plate in a lapidary's lathe with emery, until a perfectly flat surface is obtained. This surface is then worked down still finer by hand on a slab of black marble, with less coarse emery, then upon a Water of Ayr stone with water alone, and, lastly, finished by hand with water on a slab of black marble. By these means the surface acquires a sufficient polish without being contaminated with rouge or other polishing powder or oil, as is sometimes the case with purchased sections of rocks. This side of the rock is now cemented by Canada balsam on to a small piece of plate glass about $1\frac{1}{2}$ inch square and $\frac{3}{8}$ thick, which serves as a handle when grinding the other side on the emery plate as before; this grinding is continued until the section is so thin as to be in danger of breaking up from the roughness of the motion, upon which it is completed, by further grinding with emery by hand on marble, and finished first upon Water of Ayr stone with water, and afterwards upon black marble, as before described. The section is now removed from the plate-glass, and mounted in Canada balsam on a slide, covering its upper surface with a thin glass as usual.

The thickness to which such sections need be reduced is, of course, entirely dependent upon the transparency of the rock constituents, and is commonly from $\frac{1}{100}$ to $\frac{1}{1000}$ of an inch.

Thin splinters of rocks and powdered fragments, mounted in Canada balsam, may also be examined with advantage, but cannot replace the above-described sections.

The examination of such a rock section enables a mineralogical analysis to be made, even of the most compact and apparently homogeneous rock, and generally leads to the discovery of other mineral constituents previously unsuspected, from their being invisible to the eye, and also, as Sorby has observed, allows those minerals, formed at the time of solidification of the rock, to be distinguished from such as are the products of subsequent alteration. — *David Forbes, in Popular Science Review, Oct.* 1867.

THE CARPENTER BEE.

The power of boring the most symmetrical tunnels in solid wood reaches its perfection in the large Virginian Carpenter bee (*Xylocopa Virginica*). This bee is as large, and some allied exotic species are often considerably larger than the Humble bee, but not clothed with such dense hairs. We have received from Mr. James Angus, of West Farms, N. Y., a piece of trellis from a grape-vine, made of pine wood, containing the cells and young in various stages of growth, together with the larvæ and chrysalids of *Anthrax* *sinuosa*, a species of fly parasitic on the larva, which buries its head in its soft body, and feeds on its juices.

Mr. Angus thus writes us regarding its habits under date of July 19: "I asked an intelligent and observing carpenter yesterday, if he knew how long it took the Xylocopa to bore her tunnel. He said he thought she bored about one-quarter of an inch a day. I don't think myself she bores more than one half-inch, if she does that. If I mistake not, it takes her about two days to make her own length at the first start; but this being across the grain of the wood may not be so easily done as the remainder, which runs parallel with it. She always follows the grain of the wood, with the exception of the entrance, which is about her own length. The tunnels run from one to one and a half feet in length. They generally run in opposite directions from the opening, and sometimes other galleries are run one above the other, using the same opening. I think they only make new tunnels when old ones are not to be found, and that the same tunnels are used for many years. Some of the old tunnels are very wide. I have found parts of them about an inch in diameter. I think this is caused by rasping off the sides to procure the necessary material for constructing their cells. The partitions are composed of wood-raspings, and some sticky fluid, probably saliva, to make it adhere.

"The tunnels are sometimes taken possession of by other bees and wasps. I think when this is the case, the Xylocopa prefers making a new cell to cleaning out the mud and rubbish of the other species. I frequently find these bees remaining for a long time on the wing close to the opening, and bobbing their heads against the side, as if fanning air into the opening. I have seen them thus employed for twenty minutes. Whether one bee or more makes the tunnel, that is, whether they take turns in boring, I cannot say at present. In opening the cells, more than one are generally found, even at this season. About two weeks ago, I found as many as seven, I think, in one."

The hole is divided by partitions into cells about seven-tenths of an inch long. These partitions are constructed of the coarse dust or chippings made by the bee in eating out her cells, for our active little carpenter is provided with strong cutting jaws, moved by powerful muscles, and on her legs are stiff brushes of hair for cleaning out the tunnel as she descends into the heart of the solid wood. She must throw out the chips she bites off from the sides of the burrow with her hind legs, passing the load of chips backwards out of the cell with her fore-limbs, which she uses as hands.

The partitions are built most elaborately of a single flattened band of chips, which is rolled up into a coil four layers deep. One side, forming the bottom of the cell, is concave, being beaten down and smoothed off by the bee. The other side of the partition, forming the top of the cell, is flat and rough.

At the time of opening the burrow, July 8th, the cells contained nearly full-grown larvæ, with some half developed. They were feeding on the masses of pollen, which were large as a thick kidney bean, and occupied nearly half the cell. The larvæ resemble those of the Humble bee, but are slenderer, tapering more rapidly towards each end of the body.—*American Naturalist*, September.

WEATHER.

NOTHING is so much calculated to impress ordinary minds with the idea of uncertainty in the weather as the occurrence, during a rainy season, or, indeed, after any spell of wet, of a bright warm day, whose lovely sky inspires the hope that many more will follow in its train, but which is, on the morrow, perhaps sooner, obscured by wild-looking clouds, which presently become dense and dark, and pour down torrents of rain, perhaps accompanied by thunder and lightning. The wind blows up first from the south, then veers to the south-west, and is found in a day or two blowing from the north-west or north, with a great reduction of temperature, and probably, in winter, with some indication of frost in early morn.

Now, every one we meet exclaims, "How changeable and uncertain the weather is!" Strange, however, as it may appear, these various effects, so suggestive of change to our finite minds, have all arisen in their proper order of succession, from one definite cause; they exhibit the different stages of a process wisely designed to bring about a bountiful distribution of rain over the face of the country, to water the numerous productions of the soil, and to replenish our springs and rivers.. This process may be described as follows, and the explanation will prove to be an accurate *index to all changes of weather that may be impending.*

First, the *thermometer* indicates the coming change. The atmosphere resting on some limited portion of the globe, within the sphere of our climate, and which, from its position or state at the time is exposed to, or susceptible of external influences, has its temperature thereby considerably raised, a condition so often noticed before storms and heavy rains.

Now, the effect of a rise in temperature is the immediate alteration in the condition of aqueous vapour in the atmosphere; it dissipates all mists and clouds at the time floating in the atmosphere, and causes the temporary suspension of rain, before alluded to; hence the brief interval of fine weather, and the transient clearness before rain comes on again, which renders distant hills and objects unusually visible—another condition frequently observed.

Secondly, this increase of heat also rarefies the atmosphere, which, expanding upwards, overflows from its summit, the excess going off to the surrounding regions; hence the central atmospheric column becomes lighter, and it is rendered mechanically still more so by the larger proportion of aqueous vapour which is now infused into it, and which is lighter than common air. Owing to these causes, the column of air becomes much lighter, as indicated by the rapid fall of the barometer.

The atmosphere now pressing less on the surface than before, evaporation proceeds more rapidly, besides being stimulated by the increased temperature; hence, exposed surfaces dry up more rapidly before rain, a third condition indicating the coming change.

And here must be noticed a wonderful arrangement of Providence. In cold climates, and also in England during the winter season, when evaporation is slow in consequence of the low temperature, a greater reduction of pressure takes place on these occasions, which makes up in a great measure for the more feeble action of heat in evaporating moist surfaces.

But to proceed; the lighter atmospheric column induces an indraught of air at the surface from the surrounding regions, whose atmosphere has become somewhat heavier in consequence of the previous outflowing to their summits; thus we see one cause of winds blowing from opposite quarters, in connection with storms and heavy falls of rain—the rain-drops slanting in various directions, as everybody must have noticed.

The atmosphere at length becomes charged with the aqueous vapour which has been thrown up from the surface, and also brought in from the surrounding districts; and that which has ascended to the higher and colder aerial strata begins to condense into cloud, which gradually increases in density, and descends, assuming those various appearances so highly indicative of approaching rain. We may herein detect the probable cause of one type of cloud so highly ominous of heavy weather at hand. It is well known that there often exist currents in the atmosphere flowing under each other in different directions, and, as it were, brushing each other's surfaces. Now, a sheet of cloud in an upper current will have the motion of such current, and will of course retain it when, through an increase of weight, it descends on the surface of the next current; as this is moving in a different direction, it acts on the under surface of the cloud in the same way as wind acts on the surface of the sea, and gives it a curious wild, wavy appearance. This is the form significantly called "mackerels' scales," and scientifically cirro-stratus, which, with the other form called mares' tails or curl clouds, scientifically cirrus, according to the proverb, "make lofty ships carry low sails."

No ordinary observer need fail in detecting this prognostic of the coming change, as the appearance of the sky on such occasions is sufficiently striking. When the weather has been fine for some time, these curl clouds, like brushes, feathers, wisps, or locks of hair, make their appearance athwart the sky, getting much lower than usual; for their ordinary position is the highest in cloudland, corresponding, in fact, to what is called very high barometer. Their falling, therefore, plainly shows diminishing elasticity in the air, now no longer able to buoy them up in the higher regions of the air. This may be caused either by the passage of air from one region to another where, by some cause it is deficient, or it may be occasioned simply by a warmer wind blowing in the upper strata of the atmosphere. That wind is the south-west; as soon as it begins to blow aloft, the curl-clouds appear and soon cover the sky. Beneath them is formed a stratum of stackencloud (we like our old popular names) or cumulus, as Howard called it, full of protuberances and fleeces curling inwards. The wind turns to the west, the clouds become thicker, and during the night, or certainly within twenty-four hours, rain falls abundantly, and the air becomes colder.

This refrigeration attending summer rains is easily explained. Not only are masses of water precipitated from the high and cold regions of the atmosphere, reducing the temperature by means of their great capacity for heat, but this water, being immediately subjected to evaporation again absorbs a notable quantity of heat, which it takes from the earth and air and in contact with it. Hence arises the cold that is observed after rain storms.

And now another powerful cause of wind comes into operation. We must know that when invisible vapour is condensed into rain, it occupies a space sixteen or seventeen hundred times less than it did before; hence a considerable vacuum or tenuity occurs in the air whenever large quantities of rain descend, and then the air rushes in from the surrounding regions to fill the void thus occasioned, as before explained; and it is probably to this cause, acting in concert with the rarefaction due to heat before mentioned, that we must attribute those terrific hurricanes which sometimes sweep over the surface of the globe. Hence our nautical proverb,

> "When rain comes before wind,
> Halyards, sheets, and braces mind."

It is just the reverse when rain comes on after it has been blowing hard. A change of wind must follow, from the accession of new air necessitated by the precipitation of water. Hence again, another axiom on board ship,

> "When wind comes before rain,
> Soon you may make sail again."

If the barometer rises during or immediately after rain, thus showing the influx of air from the surrounding regions to restore the equilibrium, fine weather follows. This is evidence that the cause of the atmospheric disturbance was slight. But it is otherwise if the barometer continues to fall during rain and does not rise after a cessation. This proves that the disturbing cause is extensive and in force, and although a fine day may intervene, we may be sure that the weather continues unsettled.

The temporary cessation of wet may be always safely predicted if (although the barometer shows no tendency to rise) there is *an increase of temperature towards the evening.*

The diminished atmospheric pressure occasioned by heavy downpours in hot regions of the earth, must extend to a considerable distance around where fair weather probably continues, and evaporation is going on, converting a comparatively small quantity of water into a large volume of vapour; in fact, it is not only producing a supply for the heavy precipitation at the centre of the storm, but in a manner supplying the wind for its influx.

Now, as evaporation will proceed more rapidly and produce a larger volume of vapour, in the warmer latitudes, and from the surface of the seas, it follows that the stronger winds will come from that quarter and drive the storm in the opposite direction. Here we see why great storms, first rising in the tropical regions, in consequence of the greater heat and more abundant vapour there, proceed thence towards the Poles, not indeed in a straight course, because the easterly wind of the Torrid Zone first takes them westward, and afterwards the greater prevalence of the west wind with us bends their course to the eastward. The more powerful south-west wind, which at times sweeps across the British Isles, very much alters the character of the storm with us; yet every one will have noticed, even in small storms and gales, the tendency of the wind to shift round from south-east to west and north, during the time they are traversing our island from west to east, and presenting the different parts of the Cyclone to us in succession.

Finally, it cannot be too deeply impressed upon the memory of those who, either on land or sea, should not be surprised by bad weather, that if rain and clouds quickly pass away and are soon followed by warmth and a clear sky, but with the wind between south and west, the change should not be trusted,—it is only the prelude to a speedy return of more rain. If the barometer has risen rapidly after the rain, it will as quickly fall again, introducing more wet and cloudy weather.—*Everybody's Weather Guide.* By A. Steinmetz. London: L. Reeve and Co.

DESTRUCTION OF BIRDS.

In bygone days, thousands of acres of furze and underwood furnished happy homes for many a bird, and the sparrows revelled in the then prevalent thatched buildings, and herein we have something that partly justified, at that time, the war of extermination declared against birds; but now, times are changed. The forest and the common are gone, so are the thatched buildings: while the hedges are grubbed, and the poor birds driven into a very limited space. The parks and shrubberies, the church tower, and the chimney top, are the only places left in which the feathered tribe may build and rear their young: while, on the other hand, their mortal enemy, man, is ever anxious to play the sportsman, and practise on the poor remnant that is left. Hence the very proper cry against the destruction of small birds, and of the good they do in keeping under the insects, whether caterpillar, grub, or fly, which destroy crops of fruit and corn wholesale, and increase as their foes decrease.

When, four years ago, I came to my present residence, the shrubberies teemed with the feathered tribe, in consequence of the encouragements of birds by my predecessor. Wanting fruit, I declared war against the birds; "from early morn to dewy eve," there was I with my gun, till I reduced my supposed enemies so much that my garden was as still as the grave, except when I chanced to walk there: when some sparrow or finch would give the warning to his mates, for birds and beasts can talk to one another as well as my readers can; indeed, the language of bird and beast is now so familiar to me that I can always tell pretty well "what's up;" but more of this anon. The gooseberry trees put forth a goodly promise, and I looked forward with hope: but a few weeks more, and the caterpillars came rapidly; the leaves disappeared from each tree in succession, the fruit shrivelled, and notwithstanding I tried lime, and salt-and-water, the caterpillars finished them off, and then, dropping from them, took up another form of existence. Then came chaffers in their turn, and instead of songs I had plenty of buzz. The cabbages were eaten up by the green caterpillars, and the beans and roses by aphides. I determined to alter my tack for another year, by vowing never willfully destroying another bird about my ground; and I have had my reward. I have not had mischief from the grub and caterpillar tribe for the three last seasons; I have plenty of company and plenty of song. My plan is to procure some of the smallest shot, and with this shoot flying, just as you find the birds have caught the flavour of the fruit you wish to preserve; you will soon find that they can confabulate; and if you pay attention, you may soon understand their language as you slyly attempt to repeat the warning. Like boys, they will try it on a short time, but finding you are in earnest, the fruit will remain unmolested on the trees, and your conscience free from the thought of having destroyed a friend. But leave the fruit unguarded, and a combined attack is sure to follow. This is all settled in a council of birds; for they, like an attacking army, know that scouts are necessary, who give the alarm on the least appearance of danger.

Of the good birds do in the destruction of noxious insects a few anecdotes will suffice. One day seeing a cock sparrow actively employed about fifty yards from me, near a large stone in the road, I was curious to know his business. By the aid of a small telescope I brought him close to my eye; he had a large cockchaffer, and this he took up and dashed with all his might against the stone. I saw part of the chaffer's mailed coat fly off at every blow, and the soft body, when wholly divested, was borne off as a choice morsel for the sparrow's young. I then went and examined the fragments; they consisted of the broken wings and shield of the luckless chaffer.

This summer just opposite a window, a pair of sparrows have hatched successive broods under the shelter of a broken slate: morning and noon are the pair busily engaged in supplying their hungry family with food, and as they pause and carefully look round before they enter, I am enabled to see that their beaks are crammed with what are familiarly called "Daddy long-legs," and other flies. In March last, when the snow lay thick and long on the ground, my attention was directed towards a tapping just outside the room window near where I stood. Peeping through the half-drawn blind I saw a blackbird with a large garden snail, which he was busily engaged in smashing against a large stone. By repeated blows the shell was removed, and the snail soon became a choice feast for the sorely-pressed bird. Just after my park was mown it was found to be unusually full of new colonies of ants, their hills raising great impediments to the operations of my mowers. The hay being carried the rooks came for several days and seemed extremely busy. I was curious to know what they were after; and on searching I found the anthills pecked open and destroyed; the eggs were devoured, except in a few places of long standing, which formed fortresses defying all attacks. Some amateur sportsman, tempted by a good shoot from the road, gave warning to my friends to quit, since which they have not visited me. Partridges are real farmers' friends; their food, when young, consists wholly of insects. Small birds are evidently on the decrease, and many birds formerly known in this district, as the white or screech owl, and the brown owl, are seldom seen; whereas 50 years ago there was not a barn or steeple without its inhabitants, and nightly were they seen flitting silently round the fields in pursuit of mice. The numerous flocks of pigeons that formerly visited the beech woods of this locality each winter have disappeared. One thing is clear,—the unlimited destruction of birds will assuredly hand us over to a worse enemy in the shape of aphides, grubs, and flies. —HENRY GIBBONS in *Quarterly Journal of the High Wycombe Natural History Society*. October, 1867.

A CROCODILE POND.

The crocodile-pond, or "Mugger-peer," as it is called, lies to the north-west of Kurrachee. The journey for the first few miles is of the usual uninteresting description—sandy plains, intersected with deep fissures and ravines, or studded here and there with "scrub"; the oleander-leaved spurge (*Euphorbia nerifolia*), plentiful in all waste and desert parts of Scinde. Emerging from a defile which leads through a low range of hills, the traveller enters on a desert waste, stretching westward towards the mountains of Beloochistan. In the far distance two oases are visible, whose date and cocoa-nut trees are refreshing to the sight after eight miles of the most monotonous scenery. In the vicinity of the nearest grove is an ancient burial-ground, where may be observed several curiously-carved gravestones. I visited the crocodiles (*Crocodilus palustris*) on two occasions at an interval of several years, and although during that time they had been seen by hundreds of Europeans, including a certain class of mischievous young Englishmen (whose chief amusement, we were told, had been to shy stones and sticks down the throats of the gaping monsters as they lay basking on the banks of the pond), yet there seemed no diminution in their numbers, and the wild and unearthy interest of the scene was to us as great as ever. From beneath a little banyan-tree on the verge of the pond, the spectacle, during the steaming heat of a mid-day sun, might call up to the mind of the geologist the sons of the world, when "great monsters" wallowed in the seething waters of the Oolitic ages, when the mighty "Ichthyosaurus," and a host of "fearfully great lizards," dragons, &c., reigned supreme over sea and land. And as the date-palm now waves its shady boughs over the crocodiles of Mugger-peer, so then did the magnificent tree-ferns, gigantic reeds, and club-mosses, shelter their extinct predecessors. The greater pond is about 300 yards in circumference, and contains many little grassy islands, on which the majority of the crocodiles were then basking: some were asleep on its slimy sides, others half submerged in the muddy water, while now and then a huge monster would raise himself upon his diminutive legs, and waddling for a few paces, fall flat on his belly. Young ones, from a foot in length and upwards, ran nimbly along the margin of the pond, disappearing suddenly in the turbid waters as soon as we approached. The largest crocodile lives in a long narrow tank, separate from the others. The Fakirs, and natives who worship in the neighbouring temples, have painted his forehead red,—they venerate the old monster, making a salaam to His Majesty whenever he shows himself above water. A handsome young Beloochee, whose occupation it was to feed the animals, informed us that the said king was upwards of 200 years old ! (?) and that, by way of a " tit-bit," he was in the habit of devouring the young crocodiles. During our visit, this enormous brute was asleep on the bank of his dwelling-place, and seemed quite indifferent to our presence, although we came within a foot of him, and even attempted to arouse him by rubbing his nose with a leg of goat's flesh, which, however, a young one greedily seized, and dived under water. Our attendant tried in vain to excite their ferocity, but beyond a feeble attempt to snap their trenchant teeth, the animals showed no disposition to attack us. A pony was wading about in the pond, and feeding on the grassy hillocks, but the crocodiles took no notice of him. The water in the pool felt cold, although fed from two hot springs, the one of which was of so high a temperature that I could not retain my hand in it; yet animal life existed; for I found where the water bubbled up from its sandy bottom, and in the little lade running to the tank, abundance of a species of small black spiral shell, which Mr. Woodward informed me is "very like some in the British Museum, named *Melania pyramis*, an allied species of which frequents the river Jordan." The other spring gushes from under a bed of limestone, containing numbers of fossils, chiefly coral, and other marine zoophites. We had a refreshing bathe in a reservoir close by; the temperature, though not so high as the last, was still warm and pleasant. I should be sorry, however, to repeat the experiment, not from the chances of meeting with a crocodile (for, I believe, the Fakirs of the temple guard well against such accidents), but from the circumstances that (as is generally the case all over the East) lepers, and persons affected with loathsome diseases, repair to such localities. The crocodiles dig deep in the sand under the neighbouring date-trees, and there deposit their eggs. Quantities of deciduous teeth, of various sizes, were strewn along the slimy sides of the pond. Strangers are expected to stand treat, not only by the Fakirs and natives, who gain a livelihood by hanging about the pond and showing the monsters, but even the crocodiles themselves seem to anticipate a feast, and on the arrival of a party come out in unusual numbers. Accordingly we had a goat slaughtered, during which operation the brutes seemed to rouse themselves, as if preparing for a rush. Then our guide, taking piece after piece of the flesh, dashed it on the bank, uttering a low growling sound, at which the whole tank became in motion, and crocodiles, of whose existence we had before been ignorant, splashed through the shallow water, struggling which should seize the prize. The shore was literally covered with scaly monsters, snapping their jaws at one another. They seize their food with the *side* of the mouth, and toss the head backward, in order that it may fall into the throat. A few were observed to bolt their portion on shore after very slight mastication; but the majority, anxious to escape from their greedy companions, made instantly for the water, and disappeared with the piece of flesh sticking between their jaws. Our young Belooch friend informed us that they generally swallow their food at once, and do not, as has been asserted, bury it until it becomes putrid; also that other large individuals besides the old king frequently devour the young soon after they are hatched. Crocodiles wallowing in the mud of the Nile, or gavials in the Indus, are sights which one is prepared to encounter; but the traveller may wander far before he meets with a scene so strange and unexpected as that just described. How these animals found their way inland to this solitary oasis, we could not discover. It can only be surmised that they had probably been introduced by the natives.—*Wanderings of a Naturalist in India.*

SLUGS.

ANNO DOMINI 1867 seems likely to figure in horticultural and agricultural history as the year of slugs. Mr. Mechi has written to the *Times* about them, but still they come. Gardeners have not such a repute for grumbling as farmers; perhaps it is because they have less time for it, or we should have had more written complaints even than have yet appeared concerning the ravages of these slimy creatures amongst plants. Certain is it that they have devoted to their destruction this year much valuable time, which they would gladly have employed in other ways.

It has occurred to me that, before the last slug of the season is crushed under foot or dropped into the jar of salt and water, it might be interesting to some of your readers to know something of the species of slugs which are particularly injurious to gardens, and I therefore propose to give a few remarks about them, without going further into their specific differences than is requisite to enable any one, who has not previously paid any scientific attention to them, readily to put a name upon the particular sort, whose improprieties of conduct he may wish to speak or write about.

The gardener's worst enemy is the common field slug (*Limax agrestis*). It is one of the smallest of our English slugs, and is certainly the most slimy. When walking it is from 1 to 2 inches long, and barely $\frac{1}{4}$ of an inch thick. When touched it contracts itself into a slimy oval lump $\frac{3}{4}$ of an inch long by half that thickness, and if turned over two or three times upon the ground is liable to be lost, from the particles of earth which adhere to its sticky exhudation rendering it difficult to distinguish. Its colour varies from creamy brown to grey.

The next to which I shall refer (which in some localities is quite as numerous as the preceding) is *Arion hortensis*. This is the smallest of all the garden slugs, rarely exceeding an inch in length. It may readily be known by its deep black colour, while closer examination will reveal that it is marked longitudinally with indistinct streaks. By many this is erroneously supposed to be the young of that large black slug (*Arion ater*) which is so commonly seen on the grass by the sides of roads and lanes after a shower. As this latter is not often of less size than 3 inches long, and is frequently found as long as 5 inches, it is impossible to confound the two species.

In the gardens around London may be found slugs about 2 inches long, of a chocolate-brown colour, so like the earth upon which they are generally seen crawling, that it requires a tutored eye to detect them. This is the keeled slug (*Limax carinatus*), so named from a slender ridge or keel, which runs down the middle of the back to the tail. This keel is so clearly defined, and of such a distinct amber colour, that it is commonly observed before the outline of the animal is recognised upon the ground. I wish to do justice to all, even in the slug world, and I, therefore, willingly record that the keeled slug is not nearly such a "bull in a china shop" as either *Limax agrestis* or *Arion hortensis* amongst growing plants. Books record that the large *Arion ater* is very destructive amongst cabbages. It may be so, but it has not fallen to my lot to see it; I have often seen its very little brother (*Arion hortensis*) swarming upon cabbage plants; and I also know that the larger species is more fond of dead animal matter, crushed snails and worms, and garbage of all kinds, than of any living plant. I believe of *Arion ater*, that which I am sure of with *Limax carinatus*, namely, that it greatly prefers dead to living vegetable matter, and that if it can find plenty of dead leaves and fallen flowers upon the ground, it will rarely be found climbing a growing plant. Where the keeled slug occurs, it is usually very plentiful. In a small garden, about 40 feet square, on a clay soil on the south side of London, there were destroyed during the first week of last month more than 200 of this species, twice that number of *Limax agrestis* and about 40 of *Arion hortensis*. Children's eyes assisted materially in bringing about this great slaughter; their powers of observation as collectors of natural history objects are greater than many of their seniors are aware of; and when human eyes are within 3 feet of the ground without risk of lumbago—bad luck to the slugs!

I have recorded two dire pests to the horticulturist: I have also referred to two slimy creatures of doubtful character; there remains but one other garden slug to notice, and that is *Testacella haliotidea*. This curious creature feeds solely upon earth-worms, and need, therefore, never be destroyed. It is usually from 2 to 3 inches long, flattish, of a dull yellow colour, and has a small ear-shaped shell near the tail.

Perhaps some may express surprise at learning that there are so few kinds of slugs troublesome to gardeners, and may wish to know what other species have been found in the British islands. A very few words will suffice to give this information. There is a black slug (*Oncidium celticum*) found on rocks washed by the sea waves in a small bay in Cornwall. There is a beautifully spotted slug (*Geomalacus maculosus*) found only near the margins of a lake in the south-west of Ireland. There is a local sea-shore species (*Limax gagates*) found in Ireland, and at South Shields. There is a species occurring in woods, but not often seen (*Limax arborum*), which has the singular habit of letting itself down from a branch by a slimy thread, up which it can crawl again at pleasure. There are also two species (*Limax brunneus* and *Limax tenellus*), recorded as having been found in Northumberland, but both are rarities. Gardeners in the south of England evidently need not be under any anxiety about either of these kinds.

There remain but two more British species, and then all are told. These, like the black beetle and the cricket, are essentially domestic, frequenting cellars, vaults, and damp places, and feeding upon any decaying animal or vegetable matter. I have often found them in places where the only visible means of subsistence was the mildew on the damp walls, and yet they looked as sleek and fat as prize pigs. One is the yellow slug (*Limax flavus*), the other is *Limax maximus*, the largest of all our native species. These two species vary from 4 to 6 inches long, the yellow one rarely exceeding 5 inches. *Limax maximus* is grey or dull black, indistinctly spotted and striped with black ; *Limax flavus* is yellowish, and the end of the tail is keeled. Should either of these species be found in sheds or outhouses, their lives may be spared, for there is nothing that I can bring against them as a horticultural crime.

I have now passed briefly in review all the known British slugs, and hope I have succeeded in enabling any one to determine for himself which are the injurious species, and which are not.—*W. T., in Gardeners' Chronicle, Oct. 5th.*

MOSSES.

"Mosses," says a learned botanist, "like the more perfect plants, have roots, stems, branches, and leaves, which may be traced through the whole family, though in some their presence can with difficulty be detected." The roots are (in almost all the species) exceedingly small; indeed, in many of them they are so minute that they cannot be seen without the aid of a microscope. Some of the larger members of the Bryum family have the strongest roots, while in the *Orthotrichum* (or bristle moss), and others that grow upon trees and stones, the root is merely a flattened disc, necessary for attaching the plant to its resting-place. In such cases the nourishment is not, as in other plants, supplied through the root, but is principally derived from the atmosphere; indeed this is the case with all mosses, and on this account they are entirely dependent on the weather—soon withering up under a hot sunshine, and as quickly expanding again into luxuriant freshness after a shower of rain. I have said that the roots of mosses are in most of the species extremely small ; but in some, the *Bartramia arcuata* (or curved-stalked apple moss), for instance, their number makes up for their minuteness—indeed, they are so luxuriant that their brown masses almost smother the stems and foilage. Some of the trailing Hypnums and Bryums readily take root from the joints of their stems, while the *Hookeria luscens*, and others, emit rootlets from the edges and surface of their leaves. Let us turn from the roots to the stems and branches of the mosses, which present an immense variety of form. The Hypnums are for the most part trailing, but some of them, such as the *Hypnum dendroides* (or tree-like feather moss), and *Hypnum alopecurum* (or fox-tail feather moss), have strong, upright stems, like miniature palms, with a bunch of foilage at the top ; others of the family branch out more or less irregularly, and so quickly spread themselves over the banks, trees, stones, and rivulets. To the mountain torrents the trailing Hypnum, whose feathery masses cover the boulders in some deep ravine, acts as a water-filter, for the stream that has issued muddy and discoloured from the moorlands above, while trickling through its branches, is deprived of many impurities, and leaving its mossy bed it descends, limpid and pure, to sparkle in the sunshine of the valley below. Unlike the Hypnum, the *Orthotrichum* sends out a number of branches from one common centre, while the compact, cushion-like patches of *Funaria*, *Tortula*, and many of the Bryums, are found to be composed of a number of upright plants, each possessing its simple rootlets, stem, and fruit-stalk. The leaves of mosses differ in many particulars from those of other plants. In the first place, always destitute of a foot-stalk, they spring directly from the main stem, to which they are attached by the lower edge ; they are always simple and undivided, and never show any hairiness on the surface ; for though some of the species have the appearance of a hairy cushion, a close examiner will find that the fine hairs are not on the surface, but at the points of the leaves, and are, in fact, caused by the extension of the midrib to a hairy point. Another peculiarity in the leaves of mosses is that they never fall off in their decay, like those of other plants, and they have a power of reviving again if placed in water, even though months and years may have elapsed since they were gathered and dried. This property is of great advantage to the botanist, who may not have time to look over and examine the specimens he has collected ; he can put them by until a more convenient hour, and will then find that, though the mosses may have lost much of their original verdure, their parts and formation will be unchanged. Let us turn from the leaves to examine the last but not least interesting part of the moss—I mean the capsules, or seed-vessels, or in other words, the fruit of the plant, whereby its species is propagated. I have remarked that here we have no gorgeous variety of colour ; yet, if we examine some of the *Dicranum* and *Grimmia* families, we shall, on removing the protecting lid, find a scarlet-fringed vessel enclosing the minute seeds. Not for ornament alone is that brilliant scarlet fringe : it is Nature's contrivance for protecting the spores after the lid has fallen off. On a warm, sunny day it expands, to allow the seeds to ripen, and as surely closes up again when the weather is wet or frosty. Though so small as to be in some cases almost microscopic, there is much beauty and variety of form in the capsules of mosses, and chiefly by those capsules are we enabled to distinguish the different species. In *Tortula* they are long and narrow ; in *Fu*-

naria, pear-shaped; in *Bartramia*, round, like tiny apples; in *Polytrichum*, they crown the plants like polished urns of a light yellow colour, and quadrangular form; in Hypnum they are smaller, egg-shaped, and generally of an orange colour; while in *Grimmia*, the fruit appears like minute rosebuds, peeping from the foliage of the plants: and so on, there is a difference of form in each of the families, but we cannot enumerate them here. Besides the lid, which is generally of a conical form, the seed-vessels are protected by an outer covering, known as the Calyptra or veil.

When first the young fruit-stalks appear, they are carefully enclosed in the calyptra; as they grow up the membrane is pushed up by them, becomes split at the sides, and assumes whatever form is characteristic of the species. The *Encalyptra* (or extinguisher moss) takes its name from the form of its veil, which resembles the extinguisher of a candle. The *Polytrichum* (or hair moss) is so called from the hairy nature of its external veil; while in the *Hypnum serpens* (or creeping feather moss) the white veils covering the immature capsules are a pretty and remarkable feature in the plant.—*Aunt Judy's Magazine*, Oct.

STONY CORALS.

The Red Coral belongs to the section of zoophytes called Asteroida by Cuvier, in which the surface of the polypidom is fleshy, and each polypus has only eight arms. The polypi which form the massive stony corals of the tropical reefs, are furnished with numerous tentacles, and resemble in their general conformation the Sea Anemones which are so well known now-a-days as inhabitants of aquaria. The coral consists of a deposit of carbonate of lime, and each polypus dwells in a cell which exhibits a number of thin stony rays nearly meeting in the middle. The masses of coral differ exceedingly in size, some consisting of the habitations of only two or three polypi, whilst others are the gradual production of a vast and constantly succeeding population; some form branched trees and shrubs of the most various and elegant forms, others grow in solid masses, but all, when living, present a most beautiful appearance from the charming and often brilliant diversity of colours with which they are adorned.

In the Pacific Ocean several of the coral reefs are extremely beautiful, and the voyager is astonished with the curious and fantastic forms of the various marine productions of which they are composed. Wheat-sheaves, mushrooms, cabbage leaves, with innumerable plants and flowers, are vividly represented by different kinds of Coral, and glow beneath the water in brilliant tints of brown and purple, white or green; each with a peculiar form and shade of colouring, equal in richness and variety to the most beautiful productions of the vegetable world. Corals and fungi start from between the fissures of the rocks; while large portions of the former, in a dead state, connected into a solid mass, of a dull white colour, compose the stone-work of the reef. Solid masses, termed negro heads, of different dusky hues, and generally dry and blackened by exposure to the weather, are also occasionally conspicuous. Even these are not without ornament, for nature delights in the variety of her decorations. They are studded with small shells, and beautifully marked with outlines expressive of their origin. The edges of the reefs, particularly those exposed to the waves, partake of a considerable degree of lightness, and form small coves and caverns, the resort of live corals, sponges, see-eggs, and trefangs, or sea traces, (valued in China, for their invigorating quality,) and enormous cockles, which are scarcely to be distinguished from the rock, excepting when they suddenly close their shells, and discharge living fountains, which rise to the height of four or five feet.

With regard to the formation of coral reefs, it has been conjectured, from the appearance of the low islands in some parts of the South Sea and Indian Ocean (where they occur in rows or groups, while they are totally absent in other parts of the same seas), that Coral animals rear their habitations on marine shoals, or, to speak more properly, at or near the top of sub-marine mountains. As it is known, however, that the polypes can only build their coral within a small distance of the surface of the sea, and the water is often of immense depth close to the coral reefs, it has been supposed that in the Pacific Ocean, where the greater part of the Coral reefs and islands are met with, the bottom of the sea has been gradually undergoing changes, deepening in some places and becoming shallower in others, and by this supposition most of the peculiarities of the Coral reefs and islands may easily be accounted for. Where reefs are formed the bottom is generally sinking; islands indicate that the bottom is stationary or rising. In the latter case, when the corals approach close to the surface, floating substances of every kind are caught by their stony tree-like fabrics, till at length a solid mass of rock is formed, which gradually advances to the surface of the water. The deposits of the ocean no longer tenaciously adhere, but remain in a loose state, and form what is termed by mariners a key upon the summit of the reef; while the sea, by throwing up sand and mud on the top of these animal rocks, progressively raises them above its level. The new island, for such it may now be called, is soon visited by sea-birds; plants successively appear, and carpet the sterile soil with a luxuriant covering. As these decay, vegetable mould is gradually deposited; cocoanuts, or some floating seeds, flung on shore by the impetuosity of the waves, take root, and soon begin to grow; land-birds, attracted by the verdant appearance of the bank, fly thither in quest of provisions, and deposit the seeds of shrubs and trees; every high tide and every gale adds some new treasure: the appearance of an island is gradually assumed, and at length man comes to take possession.—*Loudon's Entertaining Naturalist.* London: Bell and Daldy.

MAN IN THE EARLY AGES.

In a lecture delivered by Professor Huxley at the Birmingham and Midland Institute, October 11, he said—

In approaching the question of the cause which had produced the various modifications of mankind, the first thing to do was to clear the mind of all unnecessary lumber. The first thing was to throw overboard altogether all Hebrew mythology, with its notions about Adam and Noah and the Ark, and all that business; the next thing was to throw over scientific mythology, and get rid of notions about Caucasian man, and a great deal of pestilent nonsense of that sort. And having made the mind a *tabula rasa*, it must be carried back thousands and thousands of years—it would not be an exaggeration to say millions of years—to the time when the great primogenal elephant, rhinoceros, and hyena were roaming this land familiarly. At that time man existed, and there was tolerable trustworthy evidence from recent discoveries that the capacity and conformation of the cranium of the man of that day were as good as the average capacity and conformation of the cranium of the man of the present day. It followed that there was an equal amount of brain; and as there was no reason to suppose that the quality was altered, there was no reason to doubt that the capacities of that man, whether developed or undeveloped, were substantially equal to those of the man of the present day; and reasoning upon the ordinary principles of comparative anatomy, it was justifiable to conclude that the man of that day had the same physical structure in every particular as the man of the present day—that his limbs had the same proportions, his spine the same structure, his arms, hands, and feet the same structure, as the average man of the present day. The implements and weapons relating to that period were of even more value than the remains of man himself, because they showed that he was an intelligent creature, having the same sort of capacity as the man of the present day. Well, then, if going back millions of years, when the physical conformation of the globe was entirely different from what it is now—if this did not help one to get back to any form of man which could be fairly believed to be more degraded than any form of man existing at the present day, how far back was it necessary to go? He believed that if it were possible to look back into the past, to the time when crocodiles haunted the water where the Thames now flows, and palms and tropical fruits grew in the Isle of Sheppy, man as much lower than the Australian as the Australian is to us, would be seen—something which might in some intelligible sense be looked upon as a midway form between ourselves and the lower animals; and he believed that if it were possible to scan the subsequent history of mankind, man would be found living for immeasurable ages in a stationary condition, raising himself but little above the level of the brutes—but still a very important little—gradually spreading over the surface of the globe, finding by slow degrees, and by the process known as natural selection, and the struggle for existence, that his only security lay in intelligence; finding himself weaker than animals, by no means competent to cope with them by claws and tooth, but exceedingly competent to overcome them by sharpness of wit, finding that those who were a little quicker throve better, and multiplied faster than others, and thus by barley corns of progress, mounting step by step to the condition indicated by the recent discoveries in Flanders. But long before this man must have been spread over the habitable world—a habitable world very different from ours, with land where we have water, and water where we have land. This was not language of speculation; it was a physical certainty. Now and then a group of men were shut off for thousands and thousands of years in a limited area, under particular physical conditions. Within the epoch immediately preceding our own—when the fauna and flora were what they are now—the whole of the southern part of Africa was a vast island, like Australia. It was perfectly certain that for untold ages the great sandy desert of Sahara was the bottom of a sea, continuous with the Mediterranean. Imagine in the course of these changes, a stock of men shut off, and mixing with themselves only, for untold ages, and at length hardening down into something like what were called races among animals. Imagine another lot shut off in a different part of the world—in Australia; another in South America; others in Hindostan, and the result would be distinct breeds originating even from one homogeneous kind of men. These breeds were, he believed, what were now known as persistent modifications of mankind. They were persistent because they had persisted so long. They had become what they were in virtue of the selective influences of the different localities in which they were shut up. It was in this way that the truths which lay on the side of those who maintained the diverse origin of mankind and the truths which lay on the side of those who maintained the unity of origin, were reconciled.

A NEW GEOLOGICAL THEORY.

To observe and register facts has hitherto been the chief work of geologists, and right nobly have they laboured in their vocation. The most important facts they have discovered they have, however, hitherto failed to explain : *e.g.* they assign no cause for the recent submersion of the Sahara ; and glacial theories which have been invented to account for the drift and boulders may hereafter be regarded as among the most amazing proofs of human credulity. The purpose of this letter is to present a theory which will account for these and other phenomena, and to exhibit some of the evidence by which that theory is supported.

Prof. Hansen—"probably the most eminent authority among living astronomers upon the lunar theory"—believes that the moon's centres of gravity and magnitude do not coincide ; and that, therefore, the hemisphere we see bulges into a mountain too high for water, atmosphere, or life,—the other hemisphere being proportionately depressed. If there be water on the moon, it must be all on the depressed side, where there may be also abundance of life. Moreover, the moon rotates once only while revolving round her primary, the earth, and the light of this world never reaches her farther side. Now, it is quite conceivable that her divided centres should be made to coincide, and that she should be made to rotate in fewer hours than now she requires days for that purpose. And if these changes in her shape and motion were effected, they would roll a large part of the lunar water to the side we see, and would also modify the temperature of the whole of the moon, and invert the temperature of the parts now most depressed. The moon would then be a globe with water on both sides ; but all her newest aqueous formations would be limited to one side, excepting that some portion of detritus borne by the shifting waters would be sprinkled over the surface of the hemisphere into which they rolled. In short, in these and various other ways, if such an alteration as has been supposed were to take place, there would be left evidence of that alteration for the investigation of future lunar geologists, if such geologists should ever be.

I submit that geology has already furnished us with evidence that before our era, and backward to a time remote and at present undefined, but perhaps extending to, though not comprising, the time of the older tertiaries, the earth was shaped as the moon is thought to be, and rotated as the moon does : that is to say, rotated once only while revolving round her primary, the sun. I submit further, that we have evidence that by one of the last mighty changes, this world's previously divided centres were made to coincide, the northern hemisphere rising, and the southern sinking, to the mean level ; and that at the same time the earth received its diurnal rotation. No question is now raised concerning the secondary and primary strata, or the yet more ancient part of the crust of the earth ; nor would I at present start the interesting inquiry whether the rolling of the waters, ofttimes from one hemisphere to the other, be not the normal mode of completing such globes as the earth, the moon, and Mars. My theory is, that the earth was formerly as the moon is now, having all her waters in the northern hemisphere ; and that by the last great geological change, she received her present shape and her diurnal rotation.

[Those interested will find the remainder of this letter in the *Athenæum*, Oct. 19th, well worth a perusal, we have not space to quote more.—Ed.]

Rainbows.

The rainbow presents, when perfect, the appearance of two concentric arches—the inner being called the *primary*, and the outer the *secondary* rainbow. Each is formed of the colours of the solar spectrum ; but the colours are arranged in the reversed order, the red forming the exterior ring of the primary bow, and interior of the secondary. The primary bow is formed by the sun's rays entering the upper part of the falling drops of rain, and undergoing two refractions and one reflection ; and the secondary, by the sun's rays entering the under part of the drops, and undergoing two refractions and two reflections. Hence the colours of the secondary bow are fainter than those of the primary.

Among remarkable rainbows are some which have been almost entirely of a blood-red colour, when the other prismatic tints have formed but an infinitesimal portion of the iris. These, in former times in Europe, and in superstitious countries at the present day, have been supposed to portend some national disaster of war, plague, or pestilence ; which last prediction has been in some measure verified by natural results, where the remarkable rainbow was produced by foggy malaria, arising from the place where it appeared. On the other hand, rainbows, perfectly colourless, have been seen in mists, where the globules of moisture were too minute to refract or reflect the prismatic rays. Distorted rainbows have been seen, where the usual arc or section of a circle lost its line of beauty ; and a rainbow forming a hyperbolic curve on the ground has been witnessed. Another has been seen inverted on the grass, formed by the drops of rain or dew suspended on spiders' webs in the fields. Two rainbows have been also observed at sea, where the secondary one was produced by reflection from the ocean. But the exceptional phenomenon which specially comes under our notice is where supernumerary rainbows have been observed, and which have particularly attracted the notice of meteorologists. A *third* iris between the primary and secondary bows, and *not concentric* with them, has been seen; but only a few cases are recorded. The following account, witnessed by a party of British officers during a cruise among the isles of Greece, and sketched by one of their number, describes one of the few instances on record of this most singular of rainbows:—

"On the 28th December, 1863, I was shooting at a place called Mytica, on the coast of Akernania, Greece. At this spot there is a small plateau, extending along the coast for three or four miles, and running inland for about two miles, surrounded by irregular lofty hills. Opposite lies the Island of Calamos, at a distance from Mytica varying from half a mile to three miles, forming a sort of roadstead, in which our yacht lay. At about 2 p.m., having beaten all the covers, we went on board; and, though there was hardly any wind, we made sail, being anxious to get out where we could find a harbour, or, at least, have sea-room, for the night appeared likely to be squally. After being three hours under way, during which our yacht had barely made as many miles, just about five o'clock we perceived a heavy squall, accompanied with rain, coming down through the gorge of the hills. On this a rainbow made its appearance, of the primary form; and soon afterwards the secondary bow appeared outside, with the prismatic colours inverted, as usual. Immediately this was followed by another distinct rainbow, its colours the same in succession as the primary bow, but the segment visible formed the arc of a circle whose radius was from a perfectly different centre, as it cut both the original bow and its outer arch. It was very bright and distinct, nearly as much so as the primary iris, and more than the secondary bow. The whole phenomenon did not last long, as the sun was near setting at the time; it being mid-winter in these latitudes.

"During that day, and for many days previous, the weather had been very changeable and squally: the gusts coming continually from opposite directions, within a very short space of time, and heavy clouds flying about. Soon after we had seen this strange phenomenon, we found the weather getting so bad, with the prospect of a stormy night, that, by our captain's advice, we ran back for shelter to the place we had left. It was well that we did so; for, although it was not a regular harbour, we anchored close in shore. Here we 'housed' everything, put out two anchors, and managed to hold our ground until morning. Luckily our cables were unusually strong, and the ground good for holding. During the night we had a succession of 'white squalls,' so dangerous in the Mediterranean. From our sheltered position, we were fortunate in escaping their full violence when they swept past at intervals. Even in the darkness of the night, the water, not a hundred yards from us, was lashed into such fury by the tempest that it looked as white as cream. I believe, if we had been anchored at the opposite side of the gorge, our little craft would have suffered severely, if no accident happened to any one on board. As it was, when the wind suddenly veered round, and struck the broad-side, it pitched the yacht on its beam ends, blew in the cabin windows, and our night's rest was completely spoiled. All this time the wind was from N.N.E., and continued, without variation, in that direction until next day—being considered by the sailors altogether a land-breeze, and frequent in that sea. I have sailed a good deal on the coasts of Dalmatia, Albania, and Greece, and have always found these 'white squalls,' come from the land, rushing down the mountain gorges with impetuous fury, and overwhelming the barks of luckless mariners in the Mediterranean.

"I may add that there were three brother officers with me in the yacht, who witnessed this singular rainbow as well as myself—namely, Captain Germon, Lieutenant Forsden, and Lieutenant Dunn. The sketch I made at the time of occurrence, as the yacht was becalmed, and perfectly steady.

A. J. Bingham Wright,
"Lt. H.M. 9th Regt. of Infantry."

From the foregoing plain and lucid account, together with the circumstance that the observer was an amateur artist of no mean skill, the circumstances were most favourable for recording this appearance of a rare compound rainbow. While it is interesting to the general reader, it is particularly deserving the attention of meteorologists, who, as far as we know, have not yet satisfactorily accounted for the appearance of eccentric supernumerary rainbows, of which this is an example. In general terms, the appearance of a third iris is considered "probably the result of *reflection.*" But we are of opinion that there are other circumstances attending the phenomenon, which lead to the conjecture that the downward force of the white squall, suddenly diverging the rain drops in their descent to a different angle, may have something to do with it. Be this as it may, we leave the solution of the problem an open question for the consideration of meteorologists.—*Leisure Hour*, Oct.

Signs of a Hard Winter.

Every year about this time the newspapers teem with paragraphs bearing some such heading as we have attached to this. Somebody finds a good crop of berries on his holly or hawthorn-tree, and at once sees therein a presage of a dreadful winter. Another observes that an elder-tree has acquired a deeper tint of red than usual, and he knows thereby that on the 10th of January all the rivers will be covered with three feet depth of ice, and blocks of brandy will be retailed in the taverns by a process of chopping fragments from frozen puncheons. Here is a sample of the prevailing weakness. A correspondent of the *Hants Advertiser*, who dates from Shirley, about two miles from Southampton, states that "he noticed the congregating of swallows the third week in August last, as if preparing to migrate, and now not one is seen. *He attributes* their early departure either to symptoms of an early winter or to the rain-floods, which must almost have drowned them wherever they roosted. *He says* that there are a few martins remaining. *He heard* a nettle-creeper and saw a nightingale on the 12th, but *he has not heard* the blackbird and thrush since the 24th of June; whitethroats have been more numerous than usual this summer, and robins are now in full song and very plentiful. Birds of passage *are said* to have begun their annual migration southwards through Belgium a month earlier this year than usual. Already long lines of storks have taken flight. Bustards have been killed in the neighbourhood of Paris, and wild ducks have passed in such numbers that the eye cannot follow them. This is a presage of a hard winter." This correspondent at Shirley, who illuminates our Hampshire contemporary with a sage presage of a hard winter, is evidently not sage enough to know that birds are governed in their actions by what they feel in the present, and not by what they know of the future. This attribution of prophetic wisdom to animals is as absurd, if not so nasty, as the old priestly process of divining events from the entrails of animals killed for the purpose, or, as sometimes happened, disembowelled without being killed, that the priest might have the entrails extra fresh. There was a migration of birds from northern towards southern parts of Europe a fortnight ago. No wonder, for just at that time there came from the north pole (or some other objectionable place thereabouts) a wave of cold air which pervaded Europe, and made man and beast equally afraid that winter had already come. When the temperature falls suddenly and greatly over a large tract of country, birds, having such perfect command of all climates, invariably make some migrations more or less extensive because they feel uncomfortable, but we do not learn thereby that they know anything of what is to happen six months hence. But the prediction of a hard winter from the appearance of trees is still more ridiculous, and should be expected only from philosophers in the last stage of drivelling and softening of the brain. A holly-tree knows it will be very cold in February, 1868, and so in May, 1867, it forms an extra crop of berries! Sensible doctrine that, to be sure, and very creditable to the free and independent press that gives it currency. We poor darkened horticulturists attribute good crops of fruits, whether holly-berries or grapes or apples, in great part to the temperature and other influences the trees *have been* subjected to, and would be inclined to attribute a large crop of holly-berries in 1867 to a good growth and perfect ripening of the wood in 1866; certainly not to the foresight of the tree in reference to the events of 1868. As to the movements of swallows, we saw millions on the first of this month—that is to say, on Tuesday last—near the village of Walthamstow, in Essex. Perhaps these were the flocks that the Hampshire sage saw congregating in the third week of August last, and which, having anticipated a hard winter, went away, but since then have adopted the opinion that the winter will be a mild one, and so have quietly returned. "Wild ducks have passed in such numbers that the eye cannot follow them." How wonderful, to be sure! Had we not better fly to the tropics to escape the death by frigidity next winter which is thus predicated? We believe we are indebted to our usually sober contemporary, *The Farmer*, for this bit about the wild ducks. If the "Farmer's" eye could not follow them, how intensely intense must be the cold in store for us! Dreadful consideration—"the eye cannot follow them"! Then let every wise man lay in an extra store of coals.—*Gardeners' Magazine*, Oct. 5th.

FOOD OF BIRDS.

During the years 1861—1865 inclusive, I shot a good many of our birds for the purpose of examining their crops, and took notes of the contents, and now thinking it may be interesting to your readers, I have copied out the notes. There are several interesting communications on this subject in the "Zoologist."

Kestrel (*Falco tinnunculus.*)—January, mice, shrews; February, March, mice shrews; April, beetles; May, cockchafers, blindworms; June, insects, mice; July, mice, reptiles; August, September, October, November, December, mice and small birds.

Barn Owl (*Strix flammea*).—January, mice; February, mice and rats; March, moles; April, water-rats; May, young rabbits, beetles; June, mice, insects; July, small birds, bats; August, shrews; September, dormice; October, mice, November and December, shrews, mice.

Missel Thrush (*Turdus viscivorus*).—January, holly berries, misletoe, snails; February, earth-worms, slugs; March, worms; April, snails and caterpillars; May, slugs and gooseberries; June, insects; July and August, garden fruit; September and October, mollusca; November, hips and haws; December, holly berries.

Song Thrush (*Turdus musicus*).—January, February, berries, corn-slugs, and snails; March, berries; April, green food; May, insects, berries; June, currants and snails; July, gooseberries; August, larvæ, berries; September, larvæ and mollusca; October, berries; November and December, rowan berries, hips and haws.

Blackbird (*Turdus merula*)—January, berries and snails; February, snails; March, larvæ and worms; April, larvæ and snails; May, worms; July, currants, gooseberries, cherries, worms, and snails; August, slugs, fruit; September, slugs; October, November, and December, snails, hips and haws, rowan berries.

Hedge Sparrow.—January, February, March, and April, small weed seeds; May, June, larvæ and worms; July, caterpillars; August, insects; September, October, November, December, refuse, small seeds, and larvæ.

Redbreast (*Sylvia rubecula*).—January, larvæ and seeds; February and March, seeds and berries; April and May, earthworms; June and July, currants and larvæ; August, larvæ; September, October, November, December, berries and larvæ.

Blue Titmouse (*P. cæruleus*).—January, insects; February, March, April, they pick insects out of buds and clear trees of leaf-rolling caterpillars; May, insects; June, insects, fruit; July, August, September, berries, insects; October, November, December, berries, hips and haws.

Pied Wagtail (*M. Yarrellii*).—January, February, March, insects; April, May, insects, caterpillars; June, July, August, insects, slugs; September, insects; October, November, December, mollusca and insects.

Yellow Hammer (*E. citrinella*).—January, corn seeds; February, March, April, corn seeds; May, June, July, insects; August—December, corn.

Chaffinch (*Fringilla Cœlebs.*)—January, seeds; February, seeds, grains; March, April, seeds, insects; May, insects; June, July, August, insects, fruits; September, berries, insects, grain; October, November, December, seeds, grain, berries.

House Sparrow (*Fringilla domestica*).—January, February, March, seeds and refuse; April, May, insects, green tops; June, July, August, seeds, garden fruits; September, October, November, December, grain, refuse, seeds, berries.

Linnet (*T. cannabina*).—January, February, March, seeds of weeds; April, May, June, July, August, insects and seeds; September, October, November, December, seeds of weeds.

Starling (*Sturnus vulgaris*).—January, February, March, April, worms, slugs, insects; May, June, July, worms, fruit, slugs; August, September, October, November, December, grains, slugs, worms.

Rook (*Corvus frugilegus*). —January, February, March, April, May, worms, grubs, larvæ; June, July, young birds, frogs; August, September, mice; October, November, December, carrion.

Ring Dove, Woodpigeon (*Columba palumbus*).—January, cabbage and turnip top; February, March, April, beech-mast acorns; May, June, July, green tops, clover, corn; August, September, October, corn, berries, green tops; November, December, acorns, mast. Woodpigeons seem now to do great harm to the corn. I have shot a good many this summer and have always found a quantity of green wheat in their crops, also turnip tops, and now harvest has begun they eat a good deal of ripe corn.—W.B. in *Land and Water*.

METEORS.

One of my letters received by this morning's post contains the rather puzzling query—"Do you think that there are such hard metallic substances in meteors as to forge a sword blade?" The following answer seems to suggest itself. There is a general tradition among the Tartars that the Siberian iron formerly fell from the heavens. We have a tolerably authentic testimony of a like fall in India. The Right Hon C. Greville, in a communication to the Royal Society (*Phil. Trans.*, 1803, Part 1), gives a very interesting paper, translated from the Emperor Jehangire's Memoirs of his own reign. The Prince relates that in 1620 a violent explosion was heard at a village in the Punjaub, and at the same time a luminous body fell through the air on the earth; that the officer of the district immediately repaired to the spot, and having found the place to be hot he caused it to be dug, and they reached a lump of iron violently hot; that this was sent to court, where the Emperor ordered it to be forged into a sabre, a knife, and a dagger; that, after trial, the workmen reported it was not malleable, but shivered under the hammer; and that it required to be mixed with one-third part of common iron, after which the mass was found to make excellent blades. The Royal historian adds, that on the incident of this iron of lightning being manufactured a poet presented him with a distich that:—"During his reign the earth attained order and regularity; that raw iron fell from lightning, which was, by his world-subduing authority, converted into a dagger, a knife, and two sabres." Other accounts of fallen stones almost exactly resemble this occurrence. The noticeable remark on the unmalleability of the iron tends to make the whole narrative highly credible, and throws additional weight on the inference drawn from internal evidence that the solitary masses of native iron found in different quarters of the globe have the same origin with the meteoric stones analysed by Howard and Vauquelin. Under these circumstances I am of opinion that the forging of sword blades out of meteoric substances harmonises with the historic notice we have concerning such a process.

To return to the general character of meteors. Perhaps the most remarkable meteor of modern times is that which was seen all over England on March 19, 1818—19. It was first observed at 8.15 about the Pleiades, when it moved after the manner of a falling star. The meteor in its way turned pear fashioned. Its colour was whitish, with an eye of blue of most vivid dazzling lustre, which seemed in brightness very nearly to resemble, if not surpass, that of the body of the sun on a clear day. Its height in a perpendicular line was computed to be 69 English miles from the earth's surface. It was about half a minute in passing from its first explosion to its last extinction, and it is said to have travelled at the rate of 300 geographical miles per minute. Some people imagined that they felt the warmth of its beams, others thought they were scalded by it. All accounts agree that there was heard the report of a very great cannon, which was soon followed by a rattling noise like fire-arms; this was attended by an uncommon tremor in the air, windows and doors in houses being sensibly shaken.

Comets never come and go in this fashion; nor can we imagine the possibility of their substance or nucleus being forged into sword blades—therefore, it may be fairly concluded that the periodical shooting stars are quite distinct in their nature, effects, and orbits from comets.

From various writers we collect that ordinary meteors appear—1, in every climate; 2, at every season of the year; 3, at every period of the day; 4, they appear for the most part when the sky is serene; 5, comets are never visible when the sky is cloudy, but meteors being sometimes below the cloud region are visible; 6, they proceed from, as well as towards, all points of the compass; 7, many of them in their course throws up sparks, and divide themselves into several, sometimes larger, sometimes smaller, parts before they entirely disappear—not so with comets; 8, this bursting into pieces is generally accompanied with a rumbling noise like thunder or a sudden report; 9, several after bursting seem to dissolve into smoke. The motion of comets is not sensibly apparent, nor do we ever witness their exploding or vanishing into smoke. —HENRY J. CHURCH, in *Standard*, Sept. 24th.

The Sensitive Plant.

In its native country (Brazil) this singular plant, *Acacia mimosa*, grows to the height of seven or eight feet, and is armed with short recurved thorns ; the leaves grow upon long footstalks, which are prickly, each sustaining two pair of wings. From the place where these are inserted come out small branches, having three or four globular heads of pale purplish flowers coming out from the side on short peduncles. "Naturalists," says Dr. Darwin "have not explained the immediate cause of the collapsing of the sensitive plant ; the leaves meet and close in the night, during the sleep of the plant, or when exposed to too much cold in the daytime; in the same manner as when they are affected by external violence, folding their upper surfaces together, and in part over each other, like scales or tiles, so as to expose as little of the upper surface as may be to the air. Many of the pinnate acacias close also at night, but are not otherwise sensitive, and do not indeed collapse quite so far, for when touched in the night, during their sleep, they fall still farther, especially when touched on the footstalks between the stem and the leaflets, which seem to be their most sensitive or irritable part. Now, as their situation after being exposed to external violence resembles their sleep, but with a greater degree of collapse, may it not be owing to a numbness or paralysis consequent on too violent irritation, like the fainting of animals from pain or fatigue? A sensitive plant being kept in a dark room till some hours after daybreak, its leaves and leafstalks were collapsed as in its most profound sleep, and on exposing it to the light, above twenty minutes passed before the plant was thoroughly awake and had expanded itself. During the night the upper surface of the leaves are appressed. This would seem to show that the office of this surface of the leaf was to expose the fluids of the plant to the light as well as to the air.

I have kept it in the dark and unexpanded during the entire day. Although easy grown, and required to be treated simply as a tender annual, there is no plant we grow requiring so little trouble, that excites such a lively interest, and yet is cultivated by so few people, as this sensitive plant.—E. S., *in the Floral World*, October.

Rats and Mice in India.

Among small predatory quadrupeds must decidedly be included the common brown rat (*Mus decumanus*), which, as before remarked, is nowhere a more troublesome nuisance than about Calcutta, where it is difficult to keep anything from its ravages, or it numbers within moderate control. About the best plan would be to introduce the breed of ferrets ; but then there would be no keeping these from domestic poultry and pigeons, if they were to multiply and become numerous. The common rat especially abounds in the native parts of the town, and a full-grown one is often mistaken for a bandicoot, (*Mus bandicota*) by Europeans. The latter is a much larger and more robust species, with bluff-shaped head, and it is not nearly so carnivorous or omnivorous in its appetite ; but it is little known to most people, except by name, and we remember that a reward was long vainly offered for a specimen of a true bandicoot by a gentleman in Calcutta. A full-grown animal of whatever kind is sure to be the very largest that was ever seen ! It is also so with a tiger, or with a wild Indian boar, as often with a common rat, which last is tolerably sure to be denominated a bandicoot in India, by people who do not discriminate specific differences. The black rat (*Mus rattus*) is not uncommon among the shipping in the river Hooghly, but we never saw one ashore. The common house mouse of India (*M. urbanus*) is a little different from that of Europe, but has quite similar habits. The writer never saw these mice elsewhere in such extraordinary abundance as at Lucknow, where he has seen them career across the streets in mid-day, and a party of them would be sure to be gamboling about the room when he was sitting at meals. Of other Indian rats and mice there is a small reddish-yellow rat with white under parts (*M. flavescens*) which is common in gardens, and forms its nest in the branches of trees. This kind comes sometimes into and about houses, but does not inhabit them ; though we have occasionally known one to retreat during the day, and hide in the interstices of the *jilmils* (or jalousie-blinds) of ground apartments. Another kind of rat, buff-headed and short-tailed (*M. indicus*), not unlike our British water-rat in appearance, abounds wherever there is field cultivation, and sometimes in gardens, together with a diminutive field mouse (*M. terricolor*), and again a species of gerbille (*Gerbillus indicus*), which is a rat-like animal of a fawn colour, with very long and somewhat tufted tail, and with longer hind-limbs and shorter fore-limbs than the true rats have. All these are common species, which a student of natural history is sure to become acquainted with ; and there are many more in different parts of the country, varying in their habits, and those which feed solely on grain are much eaten by certain of the lower castes of human inhabitants. Several of these field rats are highly injurious to the cultivator, as they lay up immense stores of provender in their subterranean retreats.—*Leisure Hour*, Oct.

New Books.

Our limited space must of necessity compel us to give but very short notices of new books, but they will perhaps serve as a guide as to what books our readers may ask for at their libraries.]

Mrs. Loudon's Entertaining Naturalist; being Popular Descriptions, Tales, and Anecdotes of more than 500 *Animals.* A New Edition. By W. S. Dallas, F.L.S. London : Bell and Daldy.

For young persons there is, perhaps, no better introduction to the study of Natural History than this little work. Deservedly popular for its simple and yet instructive description of birds, beasts, and fishes, we may safely recommend it to those who were not previously acquainted with it. It has been revised and enlarged by a gentleman whose knowledge particularly adapts him for the task. Several new illustrations have been added, together with such facts as were required to put it on equality with more recent works.

British Butterflies and Moths: an Introduction to the Study of our Native Lepidoptera. By H. T. Stainton, F.R.S. (Reeve & Co.)

The author of this little work is well known as a popular writer and excellent entomologist, so that it will be a great acquisition to such young people as are about to commence the study of our moths and butterflies. It is just what was required to prepare them for his more learned manual, which should follow the study of the present volume. It is got up with the usual care bestowed by Messrs. Reeve on their works, being illustrated with sixteen coloured plates and many woodcuts.

Letters Home from Spain, Algeria, and Brazil. By the Rev. Hamlet Clark, M.A., F.L.S. Van Voorst. 8vo, pp. 178, tab. 5.

A pleasant record of a trip along the coasts of Spain and Algiers, with occasional excursions inland, with some account of a voyage to Teneriffe, Brazil, &c. The author is an ardent entomologist, and can describe scenes of natural beauty with some force. All lovers of nature will be well pleased with the gossiping and unpretending style of this little volume.

AMERICAN, FRENCH, AND GERMAN WORKS.

Meteoric Astronomy: a Treatise on Shooting-stars, Fire-Balls, and Aerolites. By Daniel Kirkwood, LL.D. (Philadelphia, Lippincott and Co.: London, Trübner and Co.)

This treatise will be found one of great value to many, as the subject is treated with such a breadth that "the place of the meteors in Creation," and not minor points of difference between the rival theories, is everywhere brought home to the mind. Thus we begin with a general view of the solar system, and end with a discussion of the nebular hypothesis, the various facts and observations, and such questions as the meteoric hypothesis of solar heat and Saturn's rings being taken *en route.* There are many points of astronomical interest referred to by Dr. Kirkwood which will make the work of service to a wide circle; while to actual or possible meteor observers it is invaluable, as it contains in a small compass many data necessary for those who work in such an interesting field. The cometic theory of meteorites, so recently established, and so clearly set forth, is the foundation-stone of the science of meteoric astronomy, which, as Dr. Kirkwood has shown, will be second to none in interest, and surpassed by few in the wideness and importance of its field.

L'Eau. Par Gaston Tissandier *Bibliothèques des Mervilles.* Paris and London: L. Hatchette and Co.

The composition, transmutation, distribution, and uses of water.—The ocean forms the subject of the first chapter. The author describes the phenomena of the tides; he then represents the sea in its struggles with the land, and shows what are the productive as well as the destructive effects of the huge mass of waters which occupies so much space on our globe. The system of circulation next engages our attention. Rain, dew, snow, the various modifications of water in the atmosphere, rivers and streams, ice and fogs, are successively examined. The third chapter treats of the physical effects, and the fourth of the chemical properties, of water, and finally, an account of its numerous uses, with reference to the draining of large towns, artesian wells, and mineral springs.

Bibliographia Geographica Palestinæ, Zunächst kritische Uebersicht gedruckter und ungedruckter Beschreibungen der Reisen ins Heilige Land. Von Titus Tobler. Leipsic: Hirzel. London: Williams and Norgate.

This (the bibliography of the geography of Palestine) is a most important contribution to a study of which the abstract interest and the tangible results continue to augment day by day. The number of works extant upon this subject would astonish those who have no acquaintance with it; and the examination, description, and criticism of each by Herr Tobler form, in the aggregate, one of those marvellous monuments of erudition which none would think of looking for out of Germany. An appendix is devoted to maps and views, the latter of which are now almost superseded by photography.

Reisen und Jagden in Nord-Ost-Afrika, 1864-1865. Von Carl Graf Krockow von Wickerode. Th. I. Berlin: Duncker. London: Asher and Co.

A sporting traveller's account of the inhospitable regions between the Nile and the upper part of the Red Sea.

Mineralogy Simplified: a Short Method of Determining and Classifying Minerals, by means of Simple Chemical Experiments in the Dry and Wet Way. Translated from the last German Edition of F. Von Kobell, with an Introduction to Blow-pipe Analysis and other Additions. By Dr. Henri Erni, Chief Chemist, Department of Agriculture. Philadelphia: H. Le Baird. London: Sampson, Low, Son, and Marston. 1867.

A Manual of Blowpipe Analysis and Determinative Mineralogy. By William Elderhosrt, M.D., Professor of Chemistry in the Rensselaer Polytechnic Institute. Third Edition. Philadelphia: T. Ellwood Zell. New York: D. Van Nostrand. London: Trübner and Co. 1867.

Influence of Climate in a Commercial, Social, Sanitary, and Humanizing Point of View.—Being a Paper read before the American Geographical Statistical Society by J. Disturnell, Member of the above Society, etc. Also a Paper on the Influence of Climate in the Equatorial Regions, read before the New York Association for the Advancement of Science and Art, March 1, 1866. Accompanied by a Map of the World, showing the most important Isothermal Lines. London: Trubner and Co. 1866.

The Mines of Colorado. By Ovando T. Hollister. Springfield, Mass.: Samuel Bowles and Co. London, Trubner and Co. 1867.

Meetings of Learned Societies.

[NOTE.—*These Reports should have appeared in our last, but were postponed to make room for the Report of the British Association.*]

QUEKETT MICROSCOPICAL CLUB.

The monthly meeting was held in the Library of University College, on August 23rd, Mr. Arthur E. Durham, President, in the chair.

Mr. R. T. Lewis read a paper on "*Mermis nigrescens,*" in the course of which he gave some interesting particulars of the remarkable appearance of large numbers of these hair-worms, which were found suspended from the leaves of apple trees and shrubs in the morning following a thunderstorm which passed over the southern counties on the night of June 2nd, similar appearances having been noted in the months of June of 1791, 1832, and 1845, on each occasion after a thunderstorm. In length they varied from 2 inches to 4½ inches, but were not more than 1-20th of an inch in width. For the most part they were of a pale yellow colour, except when charged with ova, which gave a brownline. They closely resemble *Gordius aquaticus*, being a genus of the order *Gordiacea*, in the class *Entozoa*, but they differ from *Gordius* in the position of the oviduct, and also in habitat, *Gordius* being generally found in water, whilst *Mermis* inhabits damp earth. The ova in their free condition exhibit two fine filamentous appendages delicately fringed at their free ends.

Numerous specimens were exhibited at the meeting, and their structure demonstrated under the microscope. Twelve new members were elected.

Sept. 27.—This, the monthly meeting, was held at University College, Mr. Arthur E. Durham, president, in the chair. Mr. Slade read a paper on "Snails' Teeth," in which he described those organs of Mollusca known as the tongue, or palate, consisting of a long and narrow strip of membrane on which are arranged, in various patterns, successive series of strong recurved teeth, by the rasping action of which the animal is enabled to obtain its food. By this means the carnivorous mollusca bore through the shells of the animals on which they prey. The number, arrangement, and shape of these teeth afford to naturalists a means of determining species. Dr. Maddox exhibited a collection of beautifully executed microphotographs of deep sea soundings, many of the objects being magnified 3,000 times.

BOTANICAL SOCIETY OF EDINBURGH.

August 14.—This, the last meeting for the session (31st), was held in the Royal Botanic Gardens. Wm. Gorrie, Esq., V.P., in the chair. The following communications were read:—1. *On the Discovery of Buxbaumia indusiata near Aboyne*, by Professor Dickie. Dr. Dickie reported that he picked, on 29th June last, ten specimens of this rare Moss near Aboyne, being the third time it has been met with in Britain. The plants were growing on rotten timber, on the north slope of the hill of Craigendinnie.—2 *Botanical Intelligence.* By Prof. Balfour. 1. *A new Hæmodoraceous Plant.* Dr. Balfour placed on the table a flowering specimen of the plant sent by H. Fox Talbot, Esq., and which was described at the last meeting under the name of Vellozia Talboti. He proposed that it should be made a new genus, and in the meantime he would name it in honour of his friend Mr. Talbot, and designate it Talbotia elegans.—2. *Gases found in Plants.* Messrs. Faivre & Dupré have recently examined the gases found in the Mulberry and Vine, the parts which contain them, and the changes produced in them by the process of growth and development. They have arrived at the following conclusions:—1. The presence of gases in the interior of the root of the stem, and of the branches in the Mulberry and Vine, is a normal and constant fact. 2. The composition of these gases changes with the epochs of vegetation. 3. During the period of inactivity, carbonic acid is in very small proportion, and is scarcely appreciable. Oxygen is present to the same extent as in atmospheric air. During the phase of activity the contrary takes place, and the changes are more marged in proportion as the vegetation is more energetic: with the progress of vegetation, the proportion of oxygen diminishes. 4. In the roots, during the epoch of vegetation, the quantity of oxygen is not so great, while that of carbonic acid is greater than in the branches examined under the same circumstances. 5. In the branches, as in the roots, there is an inverse relation between the oxygen and the carbonic acid; by adding to the normal oxygen that disengaged under the form of carbonic acid, we obtain a number which is scarcely above the proportion of oxygen in the air. 6. In the Mulberry and the Vine, injections do not penetrate the pith or the bark, whether in the branches or roots. The ligneous layers are alone permeable to mercury. The more the formation of vessels increases, the easier and more complete are the injections. The injections are fuller in the roots than in the branches; they are also more in the branches than in the young herbaceous shoots. In the old stems of the Mulberry, the central layers cease to be permeable. 7. Microscopic examination proves that the injection specially penetrates the pitted and reticulated vessels, and also the spiral vessels in the young herbaceous shoots. 8. The pittted vessels show distinctly the mercury in the areolæ, as if in so many little pouches formed by thin portions of the wall; the same observations have been made in regard to the reticulated vessels. 9. The contents of the vessels expelled by the mercury is variable. Sometimes gas only is sent out, this is the case in winter and after dry weather. Sometimes the gas is mixed with sap, which is more or less abundant according to the epoch of vegetation and external temperature. These two latter conditions regulate in a certain degree the contents of the vessels. 10. The contents are so variable that in plants the root vessels of which contain gases and sap, the stem vessels contain only gases, or inversely. 11. The presence in the vessels of animals of oxygen and carbonic acid mixed with the blood, constitutes one of the best established facts in animal physiology; the presence of the same gases mixed with the sap in the vessels of plants, and the modifications which they there undergo, seem to establish an interesting correspondence between these two kingdoms.—3. *Nature and Structure of the Pod of Cruciferæ.* In a paper in the "Liverpool Naturalists' Journal," Dr. J. Birkbeck Nevins gives what he considers a new explanation of the nature and structure of the pod of the Cruciferæ. 4. *On the Palm Trees of Old Calabar.* Extracted from the MS. Journals of the late Mr. W. Grant Milne. By Mr. Sadler. The Ata ukot, Wine Palm or common Mimbo, is apparently an undescribed species of Raphia. It yields a very pleasant beverage, which is much appreciated by all classes of people who have the fortune, or rather misfortune to touch the western shores of Africa. It has been cultivated by the natives for ages for its watery fountain. The trees are generally seven years old before they are tapped. At this age they are from 30 to 40ft. in height. The natives ascend the trees, and pierce a hole to the centre of the stem immediately below the growing point; a small pipe is then inserted into the hole and led into a vessel which is fixed to the tree. In this way it is drained from time to time, which causes the tree to die, and it is then cut down to make room for others. The mimbo thrives best in damp situations, and such localities are generally chosen for its cultivation; at the same time, I have seen avenues of mimbo trees on high sandy places leading to towns. The people employed to tap the mimbo are Ebebo slaves, which are purchased by kings and chiefs at public slave marts. The Calabarians are not a climbing race. The Ebeboes are in practice superior in the art of "speeling." The liquid, when taken from the tree, has somewhat the colour of cream, and has a pleasant sweetish taste. This only lasts a few hours, when it becomes tartish. The natives have certain barks which they bruise and mix with the liquid, which renders it intoxicating. It is sold in the public markets; and in the Ebebo country there are mimbo public-houses, similar to our beer-shops. It is used by the missionaries' wives for making bread, being very subject to fermentation; the bread made with it is excellent. The young leaves of the plant are split up into threads and made into fine bags. 2. The Iya or Bamboo Palm, is another species of the same genus (Raphia). Its petioles are used for house building at Calabar, and all along the coast. These petioles are generally from 20 to 30ft. long. The fruit is used as an article of food, which is not the case with the last-named species. Many of the trees are from 50 to 60ft. high. In the Uwet country the natives do not cultivate the Wine Palm, consequently they tap the Bamboo; but the wine is strong and harsh and unpleasant, and is very intoxicating. I once saw the King of Uwet as tipsy from its effects as any man under the influence of brandy. The inland kings and chiefs indulge themselves to excess in drinking Bamboo wine, and consequently are always in a state of stupidity. The tree is tapped in the same way as the mimbo, at the base of the growing point. In the Qua country, at the foot of the Qua mountains, they use the wine of the Oil Palm (Elais guineensis), which is inferior to that of the Bamboo, being much harsher and stronger. In this case the trees are tapped about 2ft. from the ground, in the same way as already described. I never saw any of the natives intoxicated by this wretched fruit, but I have no doubt that they can supply ingredients to it for this purpose. Another species is the Afea oku ukot, or the white rod mimbo. The petioles of this Palm are white, while that of the Ata ukot are red. Its wine is equal in quality to that of the Ata ukot. The scales of the fruit are, however, much thicker than those of that species and the Bamboo. The Idium ibum is perhaps the most important Palm of all at Calabar. Idim signifies water, and ibum great. It occurs on the banks of the main branch of the Calabar river, but confined to the district of Ikoriofiong. The quantity of wine which this plant produces is astonishing. An ordinary tree will yield a puncheon of a most delicious beverage, which is deservedly a great favourite with the people. In colour it resembles cream, which is sold in large quantities at the mimbo public-houses. When the tree is once tapped it invariably bleeds itself to death. This is not the case with common mimbo; it can be tapped from time to time till the fluid is exhausted, and then it dies. Such is also the case with the Idim ibum, the Iya or Bamboo, the Afea oku ukot, and the Oil Palm. The last of this class of Palms, belonging to Raphia, met with at Calabar, is the Iya asiakia nditto, which signifies children. The base of the fruit is surrounded by numerous scales similar to those produced at the base of bulbiferous plants—these are called by the natives children. This Palm is not common. Another nearly allied species which is plentiful upon the south coast, sends up numerous shoots, similar to the plantain, covering a great space of ground. On the south coast a species of Date is abundant on the sea shore, but not inland. The fruit is small, and of an oval shape. In taste the pulp is similar to that of the Date of commerce. Its foliage also resembles that of the common Date, and might easily be mistaken for it were it not for the fruit. A Fan Palm is plentiful at Citia Camma, but I have not seen the plant, never having been so far south. Captain Kirkwood has two plants raised from seed collected at Citia Camma, where he states it is abundant. 5. *Notice of Two Species of Mosses New to Science.* 6. *On a Fungoid Disease affecting the Human Hair*, by John Bishop, Esq., 7. *Miscellaneous Communications.*—1. Mr. M'Nab laid before the meeting a specimen of a Cratægus which was raised from seed collected during 1828, by the late Mr. Thomas Drummond, in the Rocky Mountain district, during the second land expedition under command of the lamented Captain Franklin, late Sir John. The peculiarity of this tree is that it never flowers before July, and generally about the middle of the month, and during dull moist seasons flowers have been seen as late as the beginning of August. The tree is now about 20ft. high, having a somewhat pendulous head, and bears black fruit. It was many years before it bloomed but now it flowers annually.—2. Mr. M'Nab also placed on the table flowering plants of Goodenia amplexans and Selliera radicans, which were sent to the Botanic Garden last year from Australia by Dr. Mueller.

Correspondence.

[*Under this head we shall be glad to insert any letters of general interest.*]

BIRDS OF PASSAGE.

SIR,—Although I agree in the main with the opinion of your correspondent, Mr. H. H. Ulidia, in his letter, in your last issue, with respect to the theory proposed by Mr. A. L. Hunt, perhaps you will give me space for a few remarks on this subject.

Your correspondent, after commenting on Mr. Hunt's letter, observes :—" With 'R. W. B.,' I am quite prepared to think that some instinctive love of change induces the birds to migrate," &c.

Now, Sir, if this be so, why should these birds migrate to such far-off lands, incurring considerable weariness and danger, when their love of change might be satisfied by a flight to warmer climates much nearer home, and why should so many of them go and return, year after year, as your correspondent remarks, to the same spot with this love of change implanted in them ?

I have no doubt (as "R. W. B." observes) that the temperature of the atmosphere has a great influence on birds of passage ; but I am much more inclined to attribute their arrival and departure to the insects on which they feed. It may be observed that when the spring is cold and wet, insects, especially winged ones, are very late in coming forth from their winter haunts ; consequently, these birds are late also, for I have remarked that none of our migratory birds arrive in this country, as a general rule, before the insect tribes have made their appearances.

Again, with regard to the reason of the migration, I have no doubt that it is caused merely by the birds instinctively seeking those warmer countries, the mildness of whose climate suffers insects to live throughout the winter. For what can these birds eat during the five or six months they are absent from our island? We have proof that they do not hybernate, and their organism is such as to preclude their eating anything beyond those insects which, in the majority of species, form their ordinary food. I have no doubt, therefore, Sir, that the migration of birds is caused chiefly by their seeking warmer regions where their natural food may be obtained during the period of the cold of our climate, and also, though in a less degree, by the warmth and geniality of the more tropical countries in comparison with our own.

I am, Sir,
Yours obediently,
ARTHUR G. HARVIE.

London, October 7th.

NAMES OF BIRDS.

SIR,—" J. A. H." has been already anticipated in his remarks on the correct spelling and pronunciation of the Yellow Bunting, by Yarrell, who writes the word *yellow-ammer*, and observes :—" I have ventured to restore to this bird what I believe to have been its first English name, *yellow-ammer*, although it appears to have been printed *yellow-ham* and *yellow-hammer* from the days of Dr. Wm. Turner and Merrett to the present time. The word *ammer* is a well-known German term for bunting in very common use. Thus Bechstein employs the names *schnee-ammer*, *grau-ammer*, *rohr-ammer*, *garten-ammer*, and *gold-ammer* for our snow bunting, corn bunting, reed bunting, ortolan or garden bunting, and yellow bunting. Prefixing the letter *h* to the word appears to be unnecessary, and even erroneous, as suggesting a notion which has no reference to any known habit or quality in the bird ("British Birds," 2nd ed., vol. i., p. 493). He is followed by Wood ("Illustrated Natural History," vol. ii., p. 480), who says : — "The reader may have probably remarked that I have called the bird *yellow-ammer*, and not *yellow-hammer*, as is mostly the case. The correction is due to Mr. Yarrell, who well observes," &c.

It certainly would be as well to retain the original pronunciation and spelling of a word where it is possible to do so ; though, it must be confessed, that occasionally it would lead to awkward consequences. The common weed "hound's tongue," for instance, must become "hound's dung," a name it has earned for itself from its atrocious odour. In the name "Missel Thrush" we do retain the original pronunciation (*Mistel Drossel*), but in doing this we miss the meaning—Mistletoe.

Occasionally this purism would be of use. The "Reindeer Case," which caused so much scandal a few years ago, and which depended on the spelling of the word (whether with an *a* or an *e*), never could have arisen had the disputants known that reindeer is merely a corruption of the German *renuthier*, meaning literally, "a running animal," and therefore *must* be properly written with an *e*.

The name "Pea-fowl" is, I believe a corruption of the German name "Pfau," itself an abbreviation of the Latin "Pavo," which was intended to represent the bird's harsh cry, "Pāo, Pāo." When two consonants meet in the beginning of a German word the first has a remarkable stress laid upon it. Thus the *p* of "Pfau" (pronounced *fow*) becomes almost as strongly marked, as in our word pea-fowl."

This subject might be carried out to a much greater length ; but I will only add, that in nothing more than in pronunciation and spelling does the saying hold good, "Whatever *is*, is right." Both the one and the other are essentially arbitrary, and, in the English language, at least, dependent on no rules.

I remain, &c.,
W. W. SPICER.

Clifton, Sept. 24.

YELLOW-HAMMER *versus* "YELLOW-AMMER."

SIR,—"J. A. H.," in page 254, NATURALIST'S NOTE BOOK, expresses surprise that our common little bird, the *yellow-hammer*, is not written and pronounced *yellow-ammer*. Such authorities as "Webster's Dictionary," by Worcester, 1863, "Sullivan's Dictionary," 1866, "Chambers' Etymological Dictionary," 1867, all agree in spelling and pronouncing the bird in question *yellow-hammer*.

Is "J. A. H." right, and are the modern lexicographers wrong? He is at a loss to conceive why any bird should be called a *hammer*. Perhaps he is; and many of us, too, are equally puzzled when we attempt to account for such words as ninny-*hammer*, *hammer*-cloth, *hammer*-wort, and thousands of others. That a man, a cloth, or an herb should be called *hammer* is quite as strange to me, at least, as that a bird should be called *hammer*. Your correspondent says:— "If we could persuade educated people to see the absurdity of the wrong, and adopt the right method," &c., &c. All right, Sir; but when common consent popularly applied, together with the authority of learned philologists, persist in giving us a word which "J. A. H." rejects, then what are the vulgar or the educated to do?

> "What do you read, my Lord?
> Words, words, words."

And as they are the representatives of ideas, we must try to understand them.

I am, Sir,
Yours, &c.,
H. H. ULIDIA.

Dromore, Oct. 3, 1867.

JUVENILE MUSEUMS.

SIR,—I am glad to see the remark, in the September number of your NOTE BOOK, respecting Juvenile Museums, and I hope it will be widely carried out. In schools in Oxfordshire prizes are given half-yearly for collections of plants, birds' eggs, and fossils; also in Germany, at the Moravian School, at Newvied, near Coblentz, on the Rhine, every boy, with scarcely one exception, has a collection of old coins or relics found in the old castles on the Rhine, birds' eggs, butterflies, insects, or plants, which engenders in them a taste for natural history, and proves both instructive and interesting through life. Some of the above collections, which I have seen, are most praiseworthy.

I remain, &c.,
W. F.

Sir,—In last month's "*Naturalist's Note Book*," in speaking of a series of prizes offered by a committee of Naturalists at Newcastle-on-Tyne, you expressed a hope that our public and private schools would follow the example. It would perhaps then be interesting to you to know, that the Rev. G. F. Maclear, B.D., Head-master of King's College School, London, gave two prizes this summer for the best collection of fifty British ferns and wild flowers, and for the best collection of fifty insects. These collections were to be made during the holidays, thereby giving the boys a healthy and instructive occupation and amusement.

This example is worthy of being followed by other schools, and I think you will agree with me, that it is a thousand times better for a midsummer's "holiday task" than the old fashion, so many lines of Latin and Greek translations.

I am, Sir,
Yours obediently,
WALTER WILLIS, A.K.C.

Short Notes.

THE TESTACELLA.—The testacella is by no means rare or uncommon, but is seldom observed or captured, in consequence of its subterranean habits. To find it you must either rise at the dawn of the day, or make nocturnal explorations equipped with a powerful lanthern. It may be discovered, if thus sought for, in most of the market-gardens round about the metropolis, and it is distributed generally throughout all the western counties. It has been taken at Youghal and Bandon, in Ireland, and at Madeira, the Canaries, and in Western Europe. The lingual ribbon of the testacella is extremely large and wide, and made up of over fifty rows of minute teeth, fifty-one in each row. The teeth are conical, evenly curved, and barbed at the point. Each tooth has a projection on the middle from which the posterior end thickens. Imagine any living creature getting into such a trap as this—why, a shark's mouth is a mild kind of painless trap when compared with this slow-moving slug's. If unacquainted with this mollusk's habits, an examination of the mouth would at once lead us to infer the carnivorous propensities of the creature, and a closer insight into its ways and habits would show our judgment to be founded upon correct premises. The testacella is exclusively a destroyer of living things, the earthworm being the game that it hunts with untiring assiduity. It follows out its earthworm through its underground tunnels, as the mole hunts grubs. A very slight inspection of this curious slug will serve to show us how admirably its organization in every way adapts it to follow out its earthworm-hunting propensities. The body is extremely slender, and when stretched to its extreme point of attenuation, becomes so small and wire-like, that progression through tiny holes in the soil is rendered easy in the extreme. It creeps stealthily upon a worm, seizes it with its terrible toothed trap, and slowly swallows it, much after the fashion of a snake when bolting a frog, the victim being sucked, so to speak, by a steady, introversive action of the armed tongue into the gullet. I found the remains of several eaorthworms in the slug I captured in my garden. Dr. Ball, in describing the habits of the testacella, says: "I first became aware of the testacella preying on worms, by putting some of them in spirits, when they disgorged more of these animals than I thought they could possibly have contained. Each worm was cut, but not divided, at regular intervals. I afterwards caught them in the act of swallowing worms four and five times their own length.

When cold bleak winds and frosty mornings foretell the coming of King Winter, then the testacella, like a wise and prudent slug, mines its way down into the soil until it reaches a depth of more than a third of a fathom from the surface. Having sunk its shaft as deep as desirable, the next thing it has to do is to make a kind of sleeping-room, which is accomplished by working away the surrounding earth. But even this is not a sufficient protection. The slug has no close fitting jacket of fur or feathers to keep it warm, so instead, it secretes from glands provided for the purpose, a thick, glairy mucus, which soon partially hardens, and snugly ensconced in this self-made kind of coffin, the testacella sleeps away the dreary winter months, in utter defiance of Jack Frost, or anything he can do. Woodward thus speaks of the testacella when in winter quarters: "It forms a kind of cocoon in the ground by the exudation of mucus."—J. K. LORD in *Land and Water*, Oct. 5th.

THE PANTHER. — The panther—properly called by the natives the taindwa and borebucha, and erroneously the cheeta—varies in size in different parts of India. The largest I have ever killed was eight feet two inches from tip of nose to end of tail, measured as he lay, and the female measured seven feet six. Their skins are before me—a light yellow or buff colour, with the exception of the belly and chest, where the hair is white and much longer, with distinct black spots from half an inch to an inch and a half in diameter over the spine and towards the extremities, and differently-shaped black marks of larger size on other parts of the body—some of them are black rings, and others almost the shape of a rose. On the generality of skins of the panthers I have killed these black spots were much smaller, and none have been so beautifully marked. Their owners were killed after a desperate fight, in which I was badly wounded, near Chinwarah, in the Nagpore province. Only last year a promising young officer of the name of Shane, of the Artillery, died after three days of wounds received in a fight with a panther, close to the same spot; so that evidently there is a breed of the real fighting panther in that neighbourhood. I entirely agree with Colonel Haly in his account of the immense strength of the panther, which enables him to spring with a goat or sheep in his mouth over high inclosures; such as have been pointed out to me upwards of seven feet high, over which the panther had carried his victim. I know Nursipatam, in the Golconda zemindaree, very well, and remember hearing of the ravages of the panthers. There the jungles are tree jungles, and it is very probable that the animal, in that and in many other parts of India, lives at times in the hollows of trees. In the Deccan and Nagpore countries I have never seen them in trees; there they usually inhabit rocks, in the caves of which they remain, or in the grass and bushes of rocky ravines, the trees in which are comparatively small to what they are in forests. I have never known them in these countries to take to trees when hunted, though their retractile claws and wonderful muscular strength of forearm would enable them to climb any tree. My experience of the felis began in 1836, in the jungles in the neighbourhood of Chunai, on the Ganges, near Seeptresgur. I was lying down, in the heat of the day, when two spotted deer rushed past me, closely pressed by a panther, and I had not time to get my rifle to my shoulder. A day or two after this a tiger passed between myself and shikaree when I had no weapon in my hand. I was very green in those days, and they were the first I had ever seen. A man was struck down near me a short time after this by a tigress, and I began to respect the genus felis. From that time, for twenty years, the blood feud between us has never cooled.—*Field*, Sept. 7.

SMALL BIRDS.—Take the district from which I now write. Around me are many hundred thousands of acres of rich and fertile land, of which a great proportion is arable, and none wood or forest. What is to be done with the hosts of sparrows which swarm in our rickyards, and which devour sometimes one-third of a field of standing corn? The sparrow-hawk, the kestrel, and the merlin find no home with us; and even were they sufficiently numerous to restrain the sparrow tribe I fear that the farmer's chickens and ducklings would be heavy sufferers. Two years since a sparrow-hawk made a nest in a neighbouring tree. When complaints of theft became rife I found, on visiting her nest, the tokens of an awful slaughter of poultry, but of wild birds scarcely a feather. I should not have implicit confidence in the remedy if it were applicable, which it is not. The sparrow is, no doubt, a useful fellow in his place. Where much corn cannot be had he will do good service in thinning the insect tribes; but when too numerous, and when surrounded by corn, his habits become almost entirely graminivorous, and in the spring if he cannot have corn he will eat off every row of growing peas in a parish, to the neglect of caterpillars, aphides, or aught else. I may add that in the case of some of our most destructive insects—as *e. g.*, the larvæ of phalæna grossulariata, and many others—I know of no bird that will feed upon them at all. The robin, of almost saintly reputation, is very useful; but if robins become too numerous they will turn their attention from worm and grub to the strawberry and other fruits. I have seen three or four of these birds destroy or cut in pieces every ripe strawberry on a bed within an hour.

The blue tit is a charming little fellow, and most useful also, but woe betide the small garden in early spring if last year's young family from the crack in the old wall fail to seek new homes. Every bud upon gooseberry tree and flowering shrub will fall a sacrifice to the excessive competition in a useful trade. I might adduce many other instances of the evil of excess in the number of our useful friends, tending to show that man must from time to time interfere to check the superabundance of such tribes as may increase too rapidly. I might also show that in most parts of our island circumstances exceptionally affecting one or more of these tribes must ever exist, rendering the maintenance of a perfect balance impossible, and justifying the interference of man to repress and destroy; that they may also render man's interference needful to cultivate and distribute I am ready to admit.—*Times*, Oct. 2nd.

THE CALIFORNIAN GROUND SQUIRREL.—The common and notorious Californian Ground Squirrel (*S. Beecheyi*) ranges eastward across the Colorado valley, though in Arizona it is by no means so abundant as in California, where it forms colonies approaching those of the prairie dog in extent, and is a great pest to the farmer. In the vicinity of Los Angeles, I had an excellent opportunity of studying its habits. On the flat or slightly rolling dry plains which stretch between that town and the sea-beach, it is exceedingly numerous. The burrows occur usually in clusters, and upon little mounds or hillocks of dirt formed by the soil heaped up during their excavation; but single ones are scattered in every direction. Upon these "earth-works" the animals may be seen at all times, sitting upright, and motionless as statues, their fore-paws drooped, and their eyes intently fixed upon the passer-by; or, when no suspicious object appears, lying and basking in the sun, or playing merrily with each other upon the ramparts of their citadels. I have no doubt that the subterranean passages intercommunicate, and that each animal does not have its own entrance, though he may possess private apartments below. In the vicinity of large encampments, the grass, herbage, and in fact everything green is so closely cropped, that the ground is almost bare; and it becomes a matter for wonder that so many animals can contrive to fill their stomachs. As is the case with those of the prairie dog, the villages are inhabited by a species of burrowing owl, which takes possession of deserted holes. Over the dry plain the graceful mountain plover courses swiftly along; while overhead, or resting upon the ground is the great squirrel hawk, on the look out for its prey. The general manners of these animals call forcibly to mind the prairie dogs. Like them, they hardly venture far from their burrows, to which they hasten precipitately on the first sign of an alarm. Reaching the entrance, they stop a moment in a squat attitude, or rise on their hind-quarters, the better to reconnoitre, venting their displeasure and suspicion by a sharp, chattering bark. They are tough, muscular animals, and must be hard hit to be killed; and even when mortally wounded, will make use of their convulsive death-struggles to reach their burrows, into which they at last drop exhausted, and may be thus lost to the collector.—*American Naturalist*, September.

EXTRAORDINARY DEER HUNT AT SEA.—On Wednesday morning about ten o'clock, a deer was observed running about the sands of Dunnet, within half a mile of Castlehill Harbour, and it was noticed that on reaching the sea the animal leaped in among the breakers, which were pretty heavy, and that after breasting them he swam rapidly seawards. The boat of the schooner Inchbroom, of Thurso, Capt. Sinclair, was speedily manned by him, and by Mr. George Gunn, Castlehill, and two of the vessel's crew, both of whom rowed with a will, Mr. Gunn acting as steersman and Capt. Sinclair as harpooner, standing in the boat's bow with a coil of rope to throw over the animal's horns. On approaching the stag he showed great symptoms of excitement, lashing the sea with his feet, and swimming backwards and forwards with great velocity. The first throw of the line missed the antlers, and as the animal suddenly turned towards the shore, and was approaching the breakers, which would have instantly swamped the boat, Mr. Gunn adroitly "cut him out" by getting the boat slipped in between the stag and the shore, and Capt. Sinclair's next heave of the line was so successful that in a minute or two the deer was in tow of the boat and approaching towards Castlehill Harbour, where hundreds of workmen and others had assembled to witness the extraordinary sight of deer stalking at sea. With a good deal of difficulty and resistance on the part of the deer, which showed capital pluck throughout and made good use of points and feet. he was brought to land and taken to Castlehill stables. He is a fine stag, about five years old, and has seven points. During this season there has been an unusual number of deer seen in that district. In the present case the race of the animal to the sea was probably occasioned by being startled by dogs; but, whatever was the cause, the circumstance of such an animal being caught in Dunnet or any other bay is certainly without a parallel in natural history.—*Northern Ensign*.

A MESSAGE FROM THE STARS.—Pursuing this extraordinary line of enquiry, and obtaining at every step new, confirmatory, and beautiful results, it was resolved to ascertain if the masses of matter obtained from the atmosphere, meteoric stones, and which bear evidence of having been at a very high temperature, gave any indication of the kind of atmosphere in which they were formed. A slice from the meteoric iron of Lenarto, which was analysed by Wehrle, and found to be of sp. gr. 7·79, and to consist of iron 90·883, nickel 8·450, cobalt 0·665, and copper 0·002, was obtained. This was made the subject of careful experiment, and the Lenarto iron yielded 2·85 times its volume of gas, of which 86 per cent. nearly was hydrogen. "Hydrogen has been recognized," says Mr. Graham, "in the spectrum analysis of the fixed stars, by Messrs. Huggins and Miller. The same gas constitutes, according to the wide researches of Father Secchi, the principal element of a numerous class of stars, of which *a* Lyræ is the type. The iron of Lenarto has no doubt come from such an atmosphere, in which hydrogen greatly prevailed. *This meteorite may be looked upon as holding within it, and bearing to us hydrogen of the stars.*" The series of results which are described in this paper, though differing in their general character, have yet a strict relation to each other. When carefully studied, it will be seen that the sponge and the sugar sucking up water are only modified examples of the dense metals absorbing gases. It is by the cautious questioning of nature, and by closely inspecting the phenomena which are constantly occurring around us, that we advance to a knowledge of sublimer truths. Priestley's observation on the porosity of stoneware tubes was the germ of that discovery which may without any poetical exaggeration be described as "a message from the stars."—R. HUNT, F.R.S., in *Popular Science Review*, October.

SUNRISE AND SUNSET.—As is well known to scientific readers, no satisfactory explanation has yet been given of the red glow and splendour of sunrise and sunset. The phenomenon is one of those questions in natural philosophy which wait for a solution. Among the latest attempts at a solution is that by Dr. E. Lommel, in Poggendorff's *Annalen*, in which he shows it to be an effect of diffraction of light ss viewed through a series of dark, or partially dark, acreens. He lays it down as an axiom that a point of white light, viewed through a sufficient number of groups of screens, appears not merely reddish of itself, but also appears surrounded by a still more strongly red-eoloured aureole of diffracted light. Herein consists the explanation. The lower strata of the atmosphere are full of minute corpuscular bodies—dust, organic and inorganic, particles of carbon in smoke, and watery particles. They serve the purpose of the dark screens, and when the sun is low, the rays traversing a long range of atmosphere undergo diffraction, and by superimposition of adjacent points of light, the effect of redness is deepened. Distant snow-slopes and glaciers, as in the Alps, and clouds near the horizon, come under the influence, and often show a purplish red colour. Aqueous vapour plays an important part in the phenomenon, best seen when the whole morning or evening sky is lit with the brilliant ruddy glow. A mere red glow, without brilliance, is occasioned by the solid particles in the atmosphere. The sun looks red through smoke, and through the clouds of fine sand blown up in the desert.—*Athenæum*, Oct. 5th.

A WISE DOG.—I had the following from an acquaintance, a gentleman who fills the situation of a district registrar in Edinburgh; at least he did fill that situation so recently as 1862. This gentleman was in the habit of spending his annual holidays with a friend who held a sheep-farm on the southern slope of the Ochil Hills: during his visits he had formed a very friendly acquaintance with one of his host's dogs, and upon the occasion of his visits the dog was aye kindly speered after as soon as the health of the family was inquired about. Mr. Harriott went down to spend his holidays with his Stirlingshire friends in the autumn of 1859, and upon enquiring for his canine friend, the gude-wife informed him that "he was deed an' gane;" but she observed, by way of consolation, that, "he had left a *sin* jest as gude as himsel'." Mr. H. observed that his death was a great loss, as he was such a wise animal. "Indeed," quoth the gude woman, "ye may say that, we've have money gude tykes sin we cam' ta the farm, but we never had ane like him; last back end after ye gaed awa hame, Rab left hame ae afternin, an' about the gloaming he brought a sheep doon fra the hill, an' heck, sirs, ye wadna believe it, he gaed nine times ta the hill an' brought a sheep hame wi' him ilka time." "But," said my friend, "why did he bring the sheep home?" "That's jest whar the whole matter o' the brute's wiseness lies," said she, "every ane o' thae nine sheep was diseased, an' he brought them hame for the dooble purpose of getting cured an' preventin' the rest o' the flock frae be'n smitten."—*Land and Water*, Oct. 5th.

PLANTS AND THEIR LEAVES.—Plants have their idiosyncracies as well as other creatures. There are some which will develop their leaves a fortnight or so earlier than their brothers of the same species, others that will retain their foliage long after it has fallen from other plants of the same specific form. This did not escape the notice of the old Greek naturalists, for Theophrastus, in his work *De Plantis*, mentions a plane-tree in Crete, which never shed its leaves, and he adds, that that was the identical tree beneath whose shade Jupiter carried on his flirtation with Europa. Be that as it may, it is quite certain that, apart from individual peculiarities, such as we have just mentioned, plants of the same species will shed their leaves sooner or later according to the locality in which they grow. In the Canary Islands the vine only sheds its foliage very gradually, so that new leaves often appear before all the old ones are thrown off. The cherry-tree in Ceylon, and the peach in Brazil, are said to become almost completely evergreen. On the other hand, in colder latitudes than ours the leaves fall earlier in consonance with the earlier advent of winter. In the tropics, although there is in general not so well-marked a period of defoliation, yet the dry season seems to act in a similar way to the winter season here. Travellers tell us that there is scarcely a month in the year in which young shoots and leaves may not be seen on the trees, so that the formation of the young leaves, as well as the fall of the old ones, is spread over the whole year, as it were, and is not so much confined to particular periods as in temperate latitudes.—DR. MASTERS, in *Popular Science Review*, Oct.

THE BEECH.—The beech (*Fagus sylvatica*), if it be not the most magnificent of all British trees, certainly rivals the oak itself in size and majestic beauty; a grove of stately well-grown beeches on chalky loam is at once graceful and grand; the effect on the spectator is thoroughly awe-aspiring; the massive, smooth, upright fasciculated trunks, and the far-spreading groin-like branches call to mind some huge cathedral nave; the trunks are pier-like, massive, bossed, and channelled; the branches like arches interlacing, curving, and entangling; and the roots, moulded, curved, grotesque, and snaky, help to complete a scene of the most impressive character. The body of the tree is frequently stained of a vivid grass-green, produced by the growth of a parasitic lichen, the beauty of which is enhanced on a summer's day by the bands of pure gold projected on the limbs where the struggling sunbeams find a temporary passage through the dense umbrage above. The value of the wood for building purposes is by no means equal to the beauty of the tree; for whether in a living state and full of sap, felled for use, or dried and made up into furniture, beech-wood is invariably riddled by a parasitic worm; this is one of the principal reasons why the wood is seldom or never used for floors and roofs.—*Builder.*

THE RING-TAILED CIVET CAT.—The Ring-tailed Civet Cat (*Bassaris astuta*) is a queer animal, combining in itself the features of several distinct groups. Thus it has the ringed tail of a racoon, the pointed snout and cunning look of a fox, and the habits, at least in semi-domestication, of a house cat. It is well known to the hunters and miners of California, and by them highly prized as a pet. It is indifferently called "Mountain Cat," "Cat Squirrel," and "Racoon Fox"; is easily tamed, and makes an interesting pet, as well as a useful one, from its dexterity in catching rats and mice. In a state of nature, it is said to be chiefly nocturnal, and to show spirited fight when attacked. It is about as large as a house cat; above, is yellowish or brownish-grey; below, white; and its tail is annulated alternately with black and white.—*American Naturalist*, September.

THE AMERICAN LAKES.—Lake Superior is the largest body of fresh water in the world. It has an area of 32,000 square miles, and a mean depth of 1,000 feet. It is apparently fed by a few insignificant streams, the largest of which are the St. Louis and the Ontonagon. Lake Michigan has an area of 24,000 miles, and a mean depth of 900ft. This lake only receives a few small streams, and yet Lake Michigan furnishes a large proportion of the current that flows over the Niagara and thence down the St. Lawrence into the ocean. These great lakes must get supplied from subterranean sources. It is well known that large rivers on the western plains suddenly disappear through fissures and chasms, never again to reappear on the surface.—*Canadian Paper.*

THE SKYLARK IN AUSTRALIA.—At a recent meeting of the Acclimatization Society of New South Wales, it was stated that the skylarks introduced from England have bred freely, and that numbers are now to be seen in the fields in some parts of the colony. At the same meeting Dr. Bennett stated that Lieutenant Marochetti, of H.I.M. ship Magenta, had presented to the society two Mantchourian pheasants from the north of Pekin—the species known as Swinhoe's eared pheasant (Crossoptilon Mantchuricum), the "Ho-ky" of the Chinese—and it is the first time that this fine kind of pheasant has been introduced into Australia. Three birds arrived alive at Sydney, but one unfortunately died on board.—*Gardeners' Magazine*, Oct. 5th.

A PETRIFIED FOREST.—In the vicinity of Cairo, in a rocky and desolate region, where the mind can scarcely conceive it possible that a forest could ever have existed, countless trees are scattered about in every direction, apparently overthrown by a mighty tempest. The hills and valleys are covered with them; some of them are sixty or seventy feet in length, and upwards of three feet in diameter. There they lie, with their roots and branches perfect, and the very clefts produced by age or heat are visible. But on a closer inspection they will be found to have been changed into a hard stone, which, when cut, shows a fine variety of colour, and is susceptible of a high polish. Nothing is known of the origin of these wonderful trees. The period during which they flourished, and the very place where they grew are matters wrapped in impenetrable mystery.—*Scientific Review*, Oct.

MAGNETIC ATTRACTION.—M. Jaussen, who was sent by the French Minister of Public Instruction to investigate the phenomena accompanying the volcano of Santorin, has made a report to the Paris Academy of Sciences, which contains some interesting particulars. M. Jaussen found that the volcanic deposits and fissures had a powerful magnetic influence on the needle in the direction of the volcanic lines, and that the magnetic dip decreases greatly in localities beyond the volcanic region. An examination of the flames proceeding from the volcano by the spectroscope showed that hydrogen is their chief component; but that they also contain sodium, copper, chlorine and carbon.

GRASS SPONGE.—A new and very important article of commerce has been lately introduced into America, called "New Grass Sponge." It is found in almost exhaustless quantities among the coral reefs of the Bahamas and Coasts of Mexico and Florida. The sponge is washed and freed from grit, passed between india-rubber rollers saturated with glycerine, and then seasoned in ovens. After undergoing this treatment it is fit for use. The purposes to which it can be applied are very various; but it is especially adapted for stuffing beds, sofas, chairs, &c. One pound of this sponge is equal, for these purposes, to one and a half pound of hair.—*Athenæum.*

THE WASP.—There is one curious fact with respect to the wasp worth mentioning, and for which, besides my own observation, I am indebted to the same intelligent naturalist. It is as follows:—If the entrance to a wasp's nest be stopped up in the day time, the numerous wasps which are constantly returning to it, make no attempt to sting the aggressor; but if only one escapes from the inside it attacks him instantly, although, perhaps, not with the same pertinacity as the common bee is known to show.—E. Jesse in *Once a Week.*

LARGE BUNCH OF GRAPES.—An extraordinary bunch of grapes was exhibited at the flower show of Wednesday by Mr. Archibald Fowler, gardener to the Earl of Stair, Castle Kennedy, which weighs 17lb. 2½oz. A 100 years ago report says that a bunch of the white Syrian grape was produced at Welbeck which weighed 19½lb., but many horticulturists have since then doubted its authenticity.—*Glasgow Herald.*

EVAPORATING POWER OF PLANTS.—Some interesting experiments were made by Dr. Hales on the evaporating power of plants. He found that a sunflower plant weighing three pounds perspired about thirty ounces of water in twelve hours during a day in the month of July, but in a warm night it perspired only three ounces, and lost nothing in a cold night; on the contrary, it gained weight by imbibing dew.

New Inventions.

DR. LAWSON'S NEW CLASS AND DEMONSTRATING MICROSCOPE.—In teaching histology to large classes of students, two forms of microscope are required: one for the laboratory, with which the student himself works, and one for the class-room, which the lecturer hands to the nearest student; who passes it to his neighbour, and so on till it travels round the class. The idea of combining these two forms in a single microscope occurred to us as being both economical and convenient. The instrument represented in the adjoining cut was therefore prepared for us by Mr. Collins, of Titchfield Street.

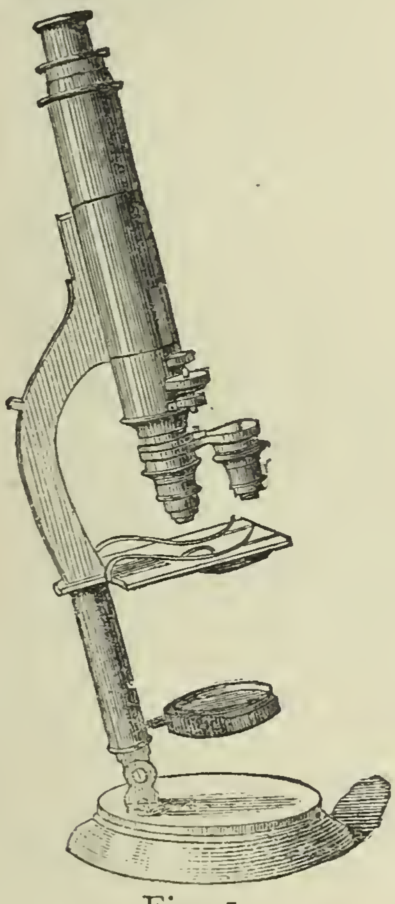


Fig. 1.

Fig 1 represents the microscope as used in the laboratory, with a double nose-piece bearing a 1 inch and $\frac{1}{4}$ inch object glass.

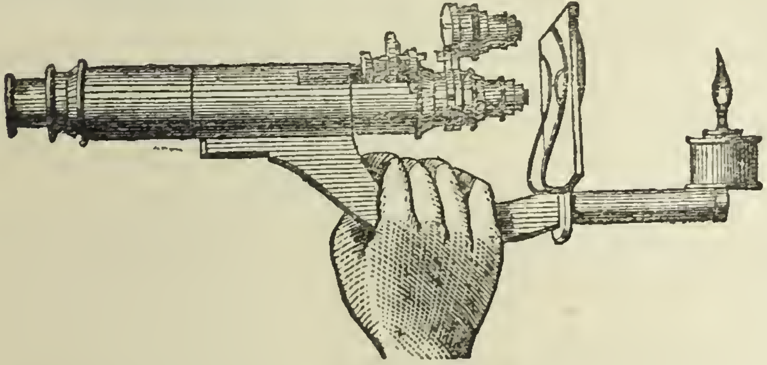


Fig. 2.

Fig. 2 shows the microscope as used in the lecture-room; the leg is drawn out from the sliding tube, which works in a knuckle-joint in the solid metal foot, and bears the mirror; on this there is fitted a small oil-lamp, and the instrument being grasped by the curved portion between the body and stage, and used like a telescope, transparent objects placed on the stage are seen with the greatest distinctness. It is remarkable, but it is no less true, that no amount of ordinary flickering of the flame is perceptible by the observer. The instrument is provided with a good 1 inch and also with $\frac{1}{4}$ inch objective, which shows the markings on *Pleurosigma formosum* most satisfactorily. The instrument is intended to meet the want of teachers in medical schools, and public institutions, and has just been selected for the histological laboratory at St. Mary's Hospital.—*Popular Science Review.*

Remarks, Queries, &c.

(*Under this head we shall be happy to insert original Remarks, Queries, &c.*)

THE LAST IRISH WOLF.—In the NATURALIST'S NOTE BOOK, page 128, an extract from *Land and Water*, giving the authority of Thompson's "Natural History of Ireland," says:—"Three places in Ireland are commemorated, each as having the last wolf killed there, viz., one in the South, another near Glenarm, and the third (Wolf hill), three miles from Belfast." As history is but the child of tradition, I might quote you hundreds of other places in Ireland (mountainous districts particularly) all laying claim, strong claim indeed, to the exterminating exploit of killing the last wolf in Ireland. At different times during the last forty years, many very clever men, through the medium of the ablest journals in Ireland, have strenuously laboured to prove the time when, and to point out the place where the last wolf—that once troublesome and dangerous prowler of our fields—was killed; but the accounts are so conflicting, that the whole affair is still a matter of doubt, each locality I presume, trusting to the validity of its own local tradition. A guide book to the northern coast of Ireland, published in Dublin in 1842, informs us that an Antrim tradition says that in 1712 the last wolf was killed in the neighbourhood of Drumnasole and Nappin.

A "Guide to the Causeway," published in 1822, says:—"Passing the village of Cairnlough, near three miles from Glenarm, the country becomes still more romantic. Tradition says the last wolf killed in Ireland was shot here in 1712."

Cork and Tipperary have their traditions about the last wolf, and those traditions quite agree in pointing out the district of the Galtees mountains as the place where the last wolf was killed in 1715. But a writer in the *Irish Penny Journal*, May 8th, 1841, goes far to nullify, or at least to render premature, the Antrim and Galtees exploits, for he informs us that "there was a presentment for killing wolves granted in Cork in the year 1710."

If so, it would seem that wolves were rather common and dangerous in Cork at that time, and hence it scarcely amounts to a probability that in three or four years they could be totally extirpated; and if the authority at hand is of any value, this view of the subject is still further confirmed by what follows in the *Irish Penny Journal*, which says that in 1739-40 wolves were killed in Co. Wexford, and also that so lately as 1770 a wolf was killed in the Wicklow mountains! "Who shall decide when doctors disagree?"

But, again, the *Ulster Journal of Archæology* informs us that a Cork alderman named Howel, writing in 1698, says:—"Wolves, indeed, we have, and foxes, but these are rather game and diversion than noxious or hateful," and, again, says Sir E. D. Burrowes,—"The wolf hunting implied by Howel terminated in 1714 by the death of the last of the race."

At Ballymena, in County Antrim, a very well authenticated tradition states that the last wolf was killed at Wood-hill, near that town, in 1727.

In the *Dublin Penny Journal*, 1832, page 10, we are told that "the last wolf seen in Ireland was killed in Kerry in 1710."

Sir John Ponsonby, in 1662, had a bill brought into Parliament to encourage the killing of wolves in Ireland. In county Louth there is a tradition that in 1718 a wedding party visited Slieve Guillon, raised a wolf on the mountain top, and killed it, but D'Alton, in his "History of Dundalk," published in 1862, does not refer to the matter. Here it may be safely presumed that wolves were killed at many, or indeed, all the places mentioned above, but the chief difficulty is in fixing dates to the transactions. The wolf-killing process was by no means a rare thing, particularly with the old people of the times in question; and 160 years ago we had no flashing telegrams, no iron horse, but few newspapers, posts slow and letters scarce—and hence for years local tradition was the only repository of the wolf-extinguishing engagements, and in the flight of time, as De Quincy says, "Dates may be forgotten, but epochs never."

Dromore. H. H. Ulidia.

Forest Trees.—Your correspondent "R. W. B." in last month's Naturalist's Note Book, asks if any of your readers can favour him with a list of "Forest Trees" which are natives of Britain. I have put down the following, which are natives of Britain, except those which are marked with a (*), and those have become so common that I thought it best to include them.

Acer Pseudo-platanus (the sycamore).
,, Campestre (the Maple).
*Æsculus Hippocastanum (the horse chesnut), introduced from Asia in the year 1629.
Alnus glutinosa (the alder).
*Albies exelsa (the spruce fir), introduced from the North of Europe, 1548.
Betula Alba (the white birch).
,, glutinosa (the common birch).
Carpinus Betulus (the hornbeam).
Castanea vulgaris (the spanish chesnut).
Cratægus Oxyacantha (the hawthorn).
Fagus sylvatica (the beech).
Fraxinus exelsior (the ash).
Ilex Aquifolium (the holly).
*Juglans regia (the common walnut), introduced from Persia 1562.
Larix Europæa (the larch fir), introduced from Germany 1629.
*Picea pectinata (the common sivel fir), introduced from Germany 1603. There is several large specimens of this fir at Rydal, near Ambleside, Westmoreland.
Pinus sylvestris (the scotch pine or fir).
Populas alba (the white poplar).
,, nigra (the black poplar).
,, tremula (the aspen or trembling poplar).
* ,, fastigiata (the Lombardy poplar), introduced from Italy 1758.
Prunus Padus (the bird cherry).
,, Avium (the wild cherry).
Pyrus communis (the wild pear tree).
,, Malus (the crab tree).
,, aucuparia (the mountain ash).
,, Aria (the white beam tree).
,, torminalis (the wild service tree).
Quercus Robur (the oak).
Salix alba (the common white willow).
,, Caprea (the goat willow).
Sambucus nigra (the elder).
Taxus baccata (the yew).
Tilia Europæa (the lime tree)
Ulmus campestris (the elm).
,, montana (the wych elm).

Besides the above the following shrub may be met with in our woods and forests.

Betula nana (the dwarf birch).
Cornus sanguinea (the dog wood or wild cornel).
Corylus Avellana (the hazel).
Euonymus europœus (the spindle tree).
Juniperus communis (the common juniper).
Mespilus germanica (the medlar).
Prunus spinosa (the sloe or blackthorn).
Rhamnus catharticus (the buckthorn).
Viburnum Lantana (the wayfaring tree).
,, Opulus (the guelder rose).

If "R. W. B." wishes to study the structure of plants, I should recommend him to "The School Botany," by Dr. Lindley; or, "The Rudiments of Botany," by Prof. Henfrey. J. W. W. B.

An Insect Destroyer.—Much the largest number of fleas are brought into our family circles by pet dogs and cats, and the pigsty is generally filled with them at this season of the year, where numbers will hop on you when visiting it for the purpose of feeding or inspection. The oil of pennyroyal will drive these insects off; but a cheaper method, where the herb flourishes, is to throw your dogs and cats into a decoction of it once a week; mow the herb, and scatter it in the beds once a month. I have seen this done for many years in succession. Where the herb cannot be got, the oil may be procured. In this case, saturate strings with it and tie them round the necks of dogs and cats; pour a little on the backs and about the ears of hogs, which you can do while they are feeding, without touching them. By repeating these applications every twelve or fifteen days, the fleas will flee from your quadrupeds to their relief and improvement, and to your relief and comfort in the house. String saturated with the oil of pennyroyal and tied around the neck and tail of horses will drive off lice; the strings should be saturated once a day. Mint, freely cut, and hung round a bedstead, or on the bed furniture, will prevent annoyance from bed insects.—*Gardeners' Magazine.*

The above is a simple and safe method of getting

rid of these pests. Fresh deal shavings are also recommended; the dogs should be allowed to sleep on them. In fact any strong perfume annoys fleas, and they therefore endeavour to get (to them) sweeter quarters.
T. S. G.

Nests.—Perhaps you may like to be told of a curious place in which I once saw a swallow's nest. In the public room of the Hôtel de Mazagran, at Bouffarik, a few miles south of Algiers, a pair of swallows had built their nest at the top of the chain of one of the lamps which were suspended from the ceiling of the public room. The birds flew in and out most amusingly whilst the room was frequented by the guests, and the waiter told me that they had returned annually for six years. In a corner of the room there was an old, apparently unfinished nest.

Perhaps I may add, that Horace Vernet and his wife were at that time at the hotel. He had property in the neighbourhood, on which he resided much, and he came to bring a sign for the hotel, of the recent taking of some place in Algeria, which he had just painted as a gift to the landlady, and which was to be hung outside by his desire.

On the subject of nests, I remember in my youth that one of the solitary wasps made a nest in the keyhole of a table drawer in the bedroom of my sisters, in Kent, and used occasionally to bring a caterpillar into it. My sisters were much concerned, on my, boylike, one day killing it, taking it for a common wasp.
Peter L. Hussey.

Lizards.—Do the full-grown English lizards (I am not sure of the species, but I think it is Zootoca Vivipara), ever prey upon the younger ones of the same species?

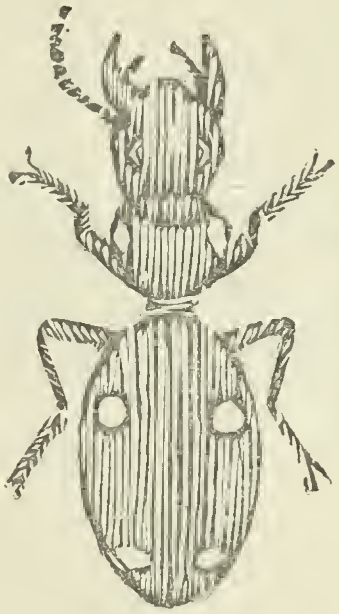
I have kept a number of lizards, large and small, for some time past in a case closely covered. The disappearance of numbers of the young ones and death of others in an unaccountable way, made me suspect that the larger ones *ate* them. I therefore watched carefully at different times, but saw nothing to confirm my suspicions. One day, however, when feeding them with flies, I saw one of the larger lizards suddenly seize a young one by the head and "worry" it, as lizards are in the habit of doing with flies, worms, &c., &c. I rescued the little reptile as quickly as possible, but it was too late; it was alive, but unable to run about, and died in a short time.
T. Sandels.

Remarkable Fecundity in a Dove.—I have in my possession a Dove. The Collared Turtle (*Turtur resorius*) which in April last I placed in a cage with a small foreign dove (of what species I do not know). I supposed the turtle dove to be a male, and out of compassion for the little lady whose mate died soon after its arrival in this "cold land," it was given to her companionship. From April until the middle of August it had laid 15 eggs, the other one 5; this is the more remarkable inasmuch as the bird in a state of nature would only have laid 4 eggs (producing two broods) at the most.

I let her sit 14 days on two eggs, thinking that would prevent her laying more, as I feared she might kill herself by exhaustion, but she continued laying until she had completed the number stated. I may mention that with the exception of the two she was allowed to sit, the eggs were taken from her at the end of the second or third day. She is now in as fine condition and as healthy as it is possible for a bird to be.

I should be glad to know if any of your readers can tell me the name and species of the small foreign dove referred to; it is about 7 inches long, slate coloured on the head and back, cream coloured on the under side towards the tail, gradually merging into a deeper shade on the breast, which is beautifully marked with crescent-shaped forms in black; the eyes are black, and the bill long and hooked; the tail black and white; feet red. It was brought from S. Africa, and I have been taught to call it the Madagascar Dove.
T. S. G.

A Curious Beetle.—In a bottle of spirits from India which I have, there was a curious beetle.



I send a ready-cut block: will you kindly insert it in the "*Note Book*," as some of your subscribers may be able to tell me its name, habits, etc. It is rather imperfect, and as I have drawn it as it is, I cannot of course tell what the missing legs &c., would be like.
A Subscriber.

Mice as Cannibals.—The common mouse is as well known among animals as the house sparrow is among birds; therefore, I need not give a description of it. It feeds greedily on grain, bread, and the like, but I have never known it to touch *meat* of any kind, (raw or cooked) when left within its reach. In a loft I am in the habit of setting a trap that catches mice by the head and kills them at once. One morning I was surprised to find two mice caught, with their hinder quarters entirely eaten away, the fore parts only being left untouched. At first I thought that this must be the work of some other species of animal, but on examining the mutilated bodies, I found I was mistaken, and that it must have been done by their fellow-mice. It was not from necessity that these mice had become *cannibals*, but from choice, as there was abundance of grain kept within their reach. A few nights later I left another pair of mice on the floor of the same room, and in the morning found them nearly consumed. I should like to hear if any of your readers have noticed this curious fact.

Mavisbush House. J. D. S. W.

Flora of Bucks.—We are requested to remind our readers that Mr. James Britten is still continuing his work of collecting materials for the above, and that he will be extremely thankful for any, even the slightest assistance. Mr. Britten states that the number of Flowering Plants and Ferns which are at present recorded for the county is 771; of these a list will shortly be published, which he will be glad to send to any one interested in the work. Regarding the botany of the entire north of the country he is almost wholly ignorant, so that the work does not yet even approach completeness. Communications should be addressed to him at High Wycombe, Bucks.

How to Distinguish Lepidoptera.—Will some kind reader inform a novice how to distinguish the sexes of lepidopteræ irrespective of wing markings? The sexes of many butterflies, for instance, the Painted Lady, Peacock, and Red Admiral, having no distinctive markings, I am quite at a loss how to arrange them properly in a cabinet. W. F.

The approaching Star Shower.—As a reader of your valuable and interesting "*Note Book*," my attention has been directed to the articles which have appeared from time to time on the subject of Meteoric Showers. Favoured as we are in this locality with great natural advantages for beholding such phenomena, I am anxious to know your opinion as to the probabilities of a recurrence of such a display as was witnessed in November last.

Kensington, Brecon. T. Butcher.

[It is probable that there will be this year an exhibition of the November shooting stars, though it is uncertain whether the phenomenon will be so well seen in Europe as it was last year. As a *display* the shower is not likely to be so splendid as it was in 1866, since on November 14th of the present year the moon will be nearly full. However there can be no doubt that the November meteors will be looked for again with great interest, since the discoveries which have been made respecting the orbit in which they move have presented them to us in a new aspect.—Richard A. Proctor, B.A., F.R.A.S., in *Intellectual Observer*, October.]

The Ancient Irish Elk.—I would feel grateful to any of your learned correspondents that would tell me when they (Irish Elk) lived, its size and habits, where skeletons have been found, and where they may be seen, what parts of Ireland it frequented most, and have any petrified remains of the Elk been found, &c? Atlas.

Frogs and their Food.—Sir, could any of your numerous correspondents inform me what Frogs feed upon when in the Tadpole condition? Fox.

Ringdoves.—I have a pair of ringdoves in a cage, and I should feel obliged to any of your correspondents if they could tell me whether I should let them out, and if I did so, whether they would return like pigeons. A. B. P.

STATE OF THE WEATHER NEAR LONDON.

Sept. and Oct.	Moon's Age.	Barometer.		Temperature.					Wind	Rain.	Remarks.
				Of the Air.			of the Earth				
		Max.	Min.	Max	Min	Mean	1 foot deep	2 feet deep			
Thurs. 19	21	30.096	30.014	68	49	58.5	60	58	E.	.00	Fine throughout; overcast at night.
Friday 19	22	30.144	30.122	68	47	57.5	59	59	N.	.00	Fine; low white clouds; clear at night.
Satur. 21	☾	30.137	30.009	66	54	60.0	60	59	S.W.	.13	Uniformly overcast; clear and fine; clear.
Sunday 22	24	30.030	29.857	65	38	51.5	59	58	N.W.	.06	Rain; cloudy and fine; clear at night.
Mon. 23	25	30.014	29.887	66	38	52.0	59	58	S.W.	.01	Rain; cloudy, and rather boisterous; clear.
Tues. 24	26	30.376	29.994	69	31	50.0	58	57	N.	.00	Boisterous; masses of dusky white clouds; clear.
Wed. 25	27	30.434	30.391	63	32	47.5	58	57	N.	.00	Partially overcast; fine; clear.
Thurs. 26	28	30.410	30.381	68	33	50.0	57	57	S.E.	.00	Foggy; very fine; overcast.
Friday 27	●	30.298	30.241	64	44	54.0	57	56	S.W.	.00	Slightly overcast; hoar frost early A.M.; clear and fine.
Satur. 28	1	30.298	30.167	66	47	56.5	58	56	S.W.	.00	Fine; cloudy; clear and fine at night.
Sunday 29	2	30.162	30.131	63	46	54.5	57	57	S.W.	.00	Overcast; cloudy; clear and fine.
Mon. 30	3	30.090	29.895	67	36	51.5	57	57	S.W.	.00	Clear; cloudy; clear and very fine.
Tues. 1	4	30.384	30.290	60	32	46.0	56	56	N.	.00	Clear and fine throughout.
Wed. 2	5	30.070	29.980	59	30	44.5	56	56	S.W.	.00	Overcast; cloudy and boisterous; clear, frosty.
Thurs. 3	6	29.942	29.914	57	31	44.0	55	55	N.W.	.00	Fine; fine, with white clouds; clear.
Friday 4	7	30.098	29.097	52	25	38.5	55	55	N.	.00	Fine, but cold and dry; overcast at night.
Satur. 5	☽	30.044	29.978	54	24	39.0	53	54	N.	.00	Clear; quite cloudless; fine; clear and frosty.
Sunday 6	9	29.932	29.828	51	37	44.0	52	53	N.W.	.15	Foggy; rain; overcast at night.
Mon. 7	10	29.612	29.512	60	31	45.5	52	52	W.	.04	Rain showers; clear and frosty; overcast.
Tues. 8	11	29.675	29.509	57	24	40.5	52	52	N.W.	.01	Clear; masses of white clouds; clear and frosty.
Wed. 9	12	29.828	29.567	48	38	43.0	51	52	S.W.	.30	Hoar frost early A.M.; rain; heavy rain at night.
Thurs. 10	13	30.098	29.670	55	26	40.5	51	51	N.	.00	Cloudy and damp; fine; clear and frosty.
Friday 11	14	30.179	29.924	53	38	45.5	51	51	S.W.	.15	Foggy; rain; heavy rain at night.
Satur. 12	15	29.831	29.753	47	33	40.0	51	51	N.E.	.02	Foggy throughout; cold at night.
Sunday 13	○	29.591	29.513	53	38	45.5	51	51	N.W.	.05	Low fog? dull and cloudy; foggy at night.
Mon. 14	17	29.760	29.629	55	45	50.0	51	51	S.	.04	Foggy; cloudy and fine; clear and fine.
Tues. 15	18	29.750	29.730	58	47	52.5	51	51	S.	.20	Cloudy and damp; fine; heavy rain in evening; clear.
Wed. 16	19	29.834	29.783	64	45	54.5	50	52	S.	.00	Cloudy and damp; fine; overcast at night.

METEORS, AËROLITES, AND SHOOTING STARS.

Early Traditions.

A CAREFUL observer directing his attention towards any quarter of the sky on a clear night, will see on an average six shooting stars per hour. We may assume therefore that about fifteen appear above the horizon of any place during each hour. More appear after than before midnight, the most favourable time for observation being from one o'clock to three. In tropical climates shooting stars are seen oftener, and shine far more brilliantly than in our northern climates. This peculiarity is due no doubt to the superior purity and serenity of the air within and near the tropics, not to any real superiority in the number of falling stars. Sir Alexander Burnes, speaking of the transparency of the dry atmosphere of Bokhara, a place not farther south than Madrid, but raised 1,200 feet above the sea-level, says—"The stars have uncommon lustre, and the Milky Way shines gloriously in the firmament. There is also a never-ceasing display of the most brilliant meteors, which dart like rockets in the sky; ten or twelve of them are sometimes seen in an hour, assuming every colour; fiery-red, blue, pale, and faint." In our climate about two-thirds of all the shooting stars seen are white; next in frequency come yellow stars, one yellow star being seen for about five white stars; there are about twice as many yellow as orange stars, and more than twice as many orange as green or blue stars.

Meteors or fire-balls are far less common than shooting stars. They are magnificent objects, their brilliancy often exceeding that of the full moon. Some, even, have been so brilliant as to cast a shadow in full daylight. They are generally followed by a brilliant luminous train, which seems to be drawn out of the substance of the fire-ball itself. Their motion is not commonly uniform, but (so to speak) impulsive; they often seem to follow a waved or contorted path; their form changes visibly, and in general they disappear with a loud explosion Occasionally, however, a meteor will be seen to separate without explosion into a number of distinct globes, accompanying each other in parallel courses, and each followed by a train. "Sometimes," says Kaemtz, "a fire-ball is divided into fragments, each of which forms a luminous globe, which then bursts in its turn; in others the mass, after having given vent to the interior gases, closes in upon itself, and then swells out anew to burst a second time." Meteors which move impulsively, generally burst at each bound, giving forth smoke and vapours, and shining afterwards with a new lustre. In some instances the crash of the explosion is so great that "houses tremble, doors and windows open, and men imagine that there is an earthquake."

Aërolites, or meteoric stones, are bodies which fall from the sky upon the earth. They are less common than meteors, but that they are far from being uncommon is shown by this, that in the British Museum alone there are preserved several hundreds of these bodies. They vary greatly in size and form; some being no larger than a man's fist, while others weigh many hundreds of pounds. Marshal Bazaine has lately brought from Mexico a meteorite weighing more than three-quarters of a ton; but this weight has been far exceeded in several cases. Thus a meteorite was presented to the British Museum in 1865, which weighs no less than three and a half tons. It had been found near Melbourne, and one half of the mass had been promised to the Melbourne Museum. But fortunately it was saved from injury. A meteorite weighing one and a quarter tons, which had been found close to the greater one, was transferred from the British to the Melbourne Museum, and the great meteorite forwarded unbroken to our national collection. A yet larger meteorite lies on the plain of Tucuman in South America; it has not been weighed, but measurement shows that its weight cannot fall short of fourteen or fifteen tons. It is from seven to seven and a half feet in length.

There have been twenty well authenticated instances of stone-falls in the British Isles since 1620. One of these took place in the immediate neighbourhood of London, on May 18th, 1680. Besides these, two meteoric stones, not seen to fall, have been found in Scotland.

The Chinese, who recorded everything, give the most ancient records of stone-falls. Their accounts of these phenomena extend to 644 years before our era, their accounts of shooting stars to 687 B.C. We need not remind our classical readers of the stone which fell at Ægos Potamos, B.C. 465, and which was as large as two millstones. In the year 921, there fell at Narni a mass which projected four feet above the river, into which it was seen to fall. There is a Mongolian tradition that there fell from heaven upon a plain near the source of the Yellow River, in Western China, a black rocky mass forty feet high. In 1620, there fell at Jahlinder a mass of meteoric iron, from which the Emperor Jehanhire had a sword forged.

These traditions had long been known, but men were not very ready to accept, without question, the fact that stones and mineral masses actually fall upon the earth from the sky. In 1803 however, a fall of aërolites occurred which admitted of no cavil. On the 26th of April, in that year, a fiery globe was seen to burst into fragments, nearly over the town of L'Aigle, in

Normandy. By this explosion thousands of stones were scattered over an elliptical area seven or 8 miles long, and about 4 miles broad. The stones were hot (but not red-hot) and smoking; the heaviest weighed about seventeen and a half pounds. The sky had been perfectly clear a few moments before the explosion. With a laudable desire to profit by so favourable an opportunity, the French Government sent M. Biot to the scene of the fall. His systematic inquiries and report sufficed to overcome the unbelief which had prevailed on the subject of stone-showers.

Another very remarkable fall is that which took place on October 1st, 1857, in the department of Yonne. Baron Seguier was with some workmen in an avenue of the grounds of Hautefeuille near Charny, when they were startled by several explosions quite unlike thunder, and by strong atmospheric disturbances. Several windows of the chateau were found to be broken. At the same time a proprietor of Château-Renard saw a globe of fire "travelling rapidly through the air towards Vernisson." Baron Seguier heard shortly after that at the same hour a shower of aerolites had fallen a few leagues from Hautefeuille, and in a locality lying precisely in the direction towards which the proprietor of Chateau-Renard had seen the meteor travelling. A mason had seen the fall, and narrowly escaped being struck by one of the fragments. This piece, which was found buried deep in the earth, near the foot of the mason's ladder, was presented to the Academy of Sciences by Baron Seguier.

Aërolites often fall from a clear sky. More commonly, however, a dark cloud is observed to form, and the stony shower is seen to be projected from its bosom. It is probable that what appears as a bright train by night is seen as a cloud by day. Something seems to depend on the position of the observer. The meteor which burst over L'Aigle appeared wholly free from cloud or smoke to those who saw it from Alencon, while to observers in L'Aigle the phenomenon was presented of a dark cloud forming suddenly in a clear sky. In a fall which took place near Kleinwinden (not far from Mühlhausen), on September 16th, 1843, a large aerolite descended with a noise like thunder, in a clear sky, and without the formation of any cloud.

The length of time during which fire-balls, which produce aërolites, are visible, has been variously stated; but we have no evidence which would lead us to accept the story of Daïmachos, that the fiery cloud from which the stone of Ægos Potamos was projected had been visible for seventy days in succession. The story seems to identify the author with a certain Daïmachos of Platæa described by Strabo as a "vendor of lies."

There is another singular fiction respecting fire-balls. It was said that shooting stars and meteors were in reality fibrous gelatinous bodies, and that such bodies had been found where meteors had been seen to fall. Reference is not unfrequently made to this fable by writers ancient and modern. Thus Dryden, in his dedication to *The Spanish Friar* speaking of Chapman's *Bussy d'Ambois* says—"I have sometimes wondered in the reading, what was become of those glaring colours which amazed me in *Bussy d'Ambois* upon the theatre; but when I had taken up what I supposed a fallen star, I found I had been cozened with a jelly; nothing but a cold dull mass, which glittered no longer than it was shooting."

One circumstance remains to be mentioned among the results of casual observation. On certain occasions shooting stars have been observed to fall in much greater numbers than on ordinary nights. Among the earliest records of such a phenomenon is the statement by Theophanes, the Byzantine historian, that in November, 472, at Constantinople, the sky seemed to be alive with flying meteors. In the month of October, 902, again, so many falling stars were seen that the year was afterwards called the "year of stars." Conde relates that the Arabs connected this fall with the death of King Ibrahim Ben-Ahmed, which took place on the night of the star shower. The year 1029 was also remarkable for a great star-fall, and in the annals of Cairo it is related that, "In the year 599, in the last Moharrun (October 19, 1202), the stars appeared like waves upon the sky, towards the east and west; they flew about like locusts, and were dispersed from left to right." A shower of stars, accompanied by the fall of several aerolites, took place over England and France, on April 4th, 1095. This was considered by many as a token of God's displeasure with King William II.: "Therefore the kynge was told by divers of his familiars that God was not content with his lyvying; but he was so wilful and proud of mind that he regarded little their saying."—*Cornhill Magazine*, November.

Lines of Projection.

M. Hoek, a Dutch astronomer, has lately shown that comets are often associated in groups, each group coming from some point of space, following nearly the same course, and appearing about the same time. Thus, the third comet of 1860 and the first and sixth comets of 1863 appear to have formed one group. They came, as it were, from the same point of the heavens, and their orbits, when laid down side by side, coalesce in the far distance, as it were, into a single path, just as the trajectories of several shot, fired from the same gun, would coincide in the portions nearest the gun, even if they had otherwise deviated considerably in their flight. The interval of three years between the appearance of the first and the last of the three is a mere point or instant of time in relation to the enormous periods during which their flight endures. A very slight difference among the original projectile forces, whatever they may have been, or a very small perturbation during their passage, by distant suns or systems, would account for much greater intervals. If, as there is good reason to believe, space itself contains a subtle fluid, a minute difference in the densities of the comets would considerably affect the time of their passage through this resisting medium. M. Hoek, on calculating back from the observed elements of their orbits, has found that for more than a thousand years they had been travelling in company. He had thus traced them back to a distance nearly 2000 times that which separates the earth from the sun. Three years on this period, or a few hundreds of millions of miles on this distance, are a mere nothing. Two comets, which appeared in 1677 and 1683, though 180 years before those above referred to, form, nevertheless, part of the same group, so far as regards coincidence in their lines of projection. During 1000 years, however, those two comets had been some 600 millions of miles in advance of the other three. Even this enormous distance, and two centuries of time, may be as nothing to the length and to the duration of the five trajectories ; and, though M. Hoek has confined himself to the correlation of comets appearing within periods of ten years, it is not improbable that many of those whose appearances succeed each other after the lapse of centuries, may have been none the less allied to one another in their birth, and none the less close companions in the early portions of their flight. M. Hoek has concluded from his computations, that comets proceed from some of the fixed stars, and move towards our systems in orbits very much elongated. Such of them as are brought within the range of the attraction of our sun, are drawn from their true orbits and made to wheel round him. Under certain conditions of distance and velocity, their new orbits are so far limited in extent that they continue to move round the sun, like planets, periodically reappearing to us. Under other conditions they pass away from our system, perhaps to be caught by some other sun, and retained within his influence. Of all the comets projected from one common focus, like the five above referred to, many may be entrapped by systems on their way, and may never reach ours. The very star from which a group of comets seems to have been projected may have only served to turn them from a course in another, or even an opposite direction.

M. Schiaparelli, of Milan, while engaged in determining the paths of the August and November meteors, found, to his surprise, that they corresponded with the orbits of two comets, one of 1862, and one of 1866. The coincidence led him to study more carefully the orbits, periods, and peculiarities of those comets. The comet of 1862 approached very near to the earth, having crossed, on the 13th of September, a point in our orbit over which the earth had passed on the preceding 10th of August. Had the comet come a month sooner, it might have formed one of the meteors which were then showered upon the earth. At all events, it moved in their line, and probably in their company ; and it presented appearances, varying from day to day, more like a meteor with a trail, shooting now from one side, now from the other, than like an ordinary comet. The period of this body has been computed to be about 108 years, and this appears to correspond with that of the August meteors. It is not, however, very easy to fix a definite period for them, because when they do appear they recur for some twenty or thirty years successively. Moreover, their course through our system must subject them to perturbations, varying in direction and quantity, according to the ever-varying positions of the planets near which they pass.

The meteors of November have a period of thirty-three years, and follow a path which coincides with that of the comet discovered by M. Tempel, at Marseilles, in 1866. And other meteoric showers have been traced to coincidence with other cometic orbits. It has also been observed that comets moving round our sun periodically, undergo a degradation, as if they were continually parting with substance. In 1845, Gambart's comet became divided into two—a large and a small one—which both returned together in 1852, but have not since appeared. Donati's comet evidently shed its substance in a trail along its path ; and there are numerous other examples of that degradation and diminution in volume and luminosity which appear to be common to all comets. It is, therefore, by no means improbable that the inter-stellar spaces have comet-dust scattered through them, and that this comet-dust, when it passes through our atmosphere, may form the shooting stars. It might be too bold to affirm that the larger meteors, with their balls and trails, are comets themselves.

M. Schiaparelli supposes that a cloud of matter, cometic or cosmic dust as it were, moves from some distant region of space in a straight line, or at least in a line which is a portion of an orbit so elongated that it may be taken as straight. On approaching our system, this cloud is, by the sun's attraction, drawn out into an extended current, as may be readily understood on considering the superior attractive force exerted upon its front portions. So immense is this dust-cloud, that, when thus wire-drawn, as it were it may take thousands of years in effecting its passage through our system. The form of the current is necessarily that of a comit's orbit; for the law which governs the movements of one particle, governs the movements of all. If this orbit crosses that of the earth once a year, the earth must pass through the torrent, and gather, to itself all such particles as come within the influence of its attraction. Such, probably, are the meteors and shooting-stars of August and November. These, however, do not form parts of torrents coming from distant space, but wheel round the sun with definite periods, like long elliptical rings, through which we pass annually, levying our tribute as we pass. It is, however, extremely difficult to ascertain correctly the elements of these orbits, because the bodies which move in them are subject to extensive perambulations, and are so minute as to escape observation, except when they are almost in contact with the earth.—*Scientific Review*, November.

Principal Star Showers.

It will probably be interesting if we give brief notices of a few of the principal authentic No. vember star-showers. It is from these data tha- the first approximation of the period of revolut tion of this cosmical ring has been obtained- Most writers on this subject have already alluded to these phenomena recorded here and there in old histories. We do not, however, hesitate to reproduce one or two of them once more. The dates of recorded November star-showers are the years 902, 931, 934, 1002, 1101, 1202, 1366, 1533, 1602, 1698, 1799, 1832, 1833, 1866. Conde, in his "History of the Dominion of the Arabs in Spain," mentions that on the death of King Ibrahim bin Ahmad, in the year 902, about the middle of October, O.S., "an infinite number of stars were seen during the night, scattering themselves like rain to the right and left, and that year was known as the year of the stars." An Arab writer relates of the same phenomenon that "in this year there happened in Egypt an earthquake, lasting from the middle of the night until morning; and so-called flaming stars struck one against another violently, while being borne eastward and westward, northward and southward; and none could bear to look towards the heavens." These accounts from Mohammedan sources, though bearing evident marks of superstition and exaggerated observation, are sufficient to show that a probable unusual meteoric display took place in the year indicated.

We have another Mohammedan record that "in the year 599 (A.D. 1202), on the night of Saturday, on the last day of Muharram, stars shot hither and thither in the heavens, eastward and westward, and flew against one another, like a scattered swarm of locusts, to the right and left. This phenomenon lasted until daybreak. People were thrown into consternation, and cried to God the Most High with confused clamour; the like of it never happened except in the year of the mission of the Prophet, and in the year 241."

Any unusual celestial phenomenon was always considered in former ages as some omen portending good or evil to the nation. This superstitious feeling is clearly shown in an extract from a Portuguese work, "Chronicas des Reis de Portugal Reformadas," 1660, relating to an unusual star-shower. "In the year 1366, and xxii days of the month of October (O.S.) being past, there was in the heavens a movement of stars, such as men never before saw or heard of. From midnight onwards, all the stars moved from the east to the west; and after being together, they began to move, some in one direction, and others in another. And afterwards they fell from the sky in such numbers, and so thickly together, that as they descended low in the air they seemed large and fiery, and the sky and the air seemed to be in flames, and even the earth appeared ready to take fire. That portion of the sky where there were no stars seemed to be divided into many parts, and this lasted for a long time. Those that saw it were filled with such great fear and dismay that they were astounded, imagining they were all dead men, and that the end of the world had come." It appears to us that this apparently improbable account may be sensibly true, and that the meteoric display might have been accompanied by a coloured aurora, the streamers of which, with very little imagination, would be suggestive of fire.

It is not necessary to notice any more of these ancient meteoric showers, excepting only to state that the dates have been satisfactorily proved, and that they have done good service as data for modern calculations.

Of modern displays, Humboldt's description of that of November 12, 1799, as seen by him and M. Bonpland at Cumana, South America, is well known. During four hours, thousands of falling stars were noticed. M. Bonpland states that there was not a space in the firmament equal in extent to three diameters of the moon, that was not filled at every instant with bodies and falling stars. The meteors were visible till sunrise. The same phenomena were observed at other places in South America, some distant 700 miles from Cumana.

It must be understood that the small cosmical bodies composing the November ring of meteors move in orbits, which cut the plane of the ecliptic near the point occupied by our earth about the 13th of November, and consequently, can only be seen yearly about that day. And it must also be borne in mind that the smaller showers of meteors which are frequently observed at other periods of the year belong to a collection of meteors moving around the sun in orbits, inclined at different angles to the ecliptic, each system differing from another. In short, it has been found from observation that there are several of these rings or systems crossing the earth's path at different periods of the year, the November and August meteors being the most numerous. From this we may naturally infer that these bodies only become visible on entering the earth's atmosphere, being rendered luminous by the great heat developed by friction, when they burn for a second or two, and are then finally dissipated into smoke or dust.

On account of the apparent rapid motion of meteors, the only satisfactory observations made during great displays are those for the determination of the point in the heavens from which they radiate. This apparent orbital velocity is ascertained to be about thirty-eight miles a second, made up by the compound effect of the movements of the earth and the meteors in their respective orbits, that of the earth being direct, while that of the meteors is retrograde. But when, as in the case of the great shower of last November, the observer is enabled to multiply his observations almost to an indefinite extent, this great velocity does not materially interfere in obtaining a correct determination of the exact position of the radiant point. On the accuracy of our knowledge of the position of this point almost everything depends in the calculation of the dimensions and position in space of the meteoric orbit. It does not, however, require a practised astronomer to notice that, on such a display as that of November last, the majority of the meteors eminated from one spot in the heavens, for that was soon evident to the senses of the most casual observer. It is found, from the average of the observations made by six astronomers, that the exact position of this radiant point of the November meteors is 149° 12′ of right ascension, and 23° 1′ of north declination. Any person having access to a celestial globe or map can identify for himself this position in a moment. He will see that it is situated between the well-known stars Regulus and Epsilon Leonis. From this accurately-observed radiant point of the November meteors much of our present knowledge of the movement of these bodies is derived. It may be mentioned here that the radiant point of the August meteors is situated in the constellation Perseus. Of meteors in general, about sixty radiant points have been determined with more or less certainty: some of these have, however, been inferred from isolated observations of meteors noticed on the same day in different years.—*Leisure Hour*, November.

Effects of Acid on Meteoric Iron.

SOME interesting particulars concerning aëroliths are given in a series of articles published by the "Cosmos" on the subject. Widmanstætten was the first to discover a singular peculiarity of meteoric iron when treated with acids. We know that if we let fall a drop of one of the latter on a plate of polished terrestrial iron, the polish will be destroyed and replaced by a finely grained surface. This is not the case with meteoric iron; the place where the acid exercises its action will display a variety of complicated figures remarkable for their great regularity. They consist of brilliant lines crossing each other at different angles, and distinctly set off on the dull ground made by the acid on the polished surface. As these lines are in relief they may be printed off on paper. They are owing to the crystallization of the mass, which also contains small and regularly oriented laminæ of a substance insoluble in acids, and which Berzelius has found to be a double phosphuret of iron and nickel containing a proportion of magnesium. This compound is called "Schreibersite;" but the figures it produces are not always regular in all meteorites. This is the case with the iron found at Scriba, in 1814, and at Decotah, U.S., in 1863. That of Caille, on the contrary, discovered in 1828, by Brard, by the side of the church portal, where it had for two centuries past performed the office of a seat, and was called by the people the iron stone, presents these figures with remarkable clearness; the same is the case with the iron found in 1792, at Zacatecas, Mexico. In April last, M. Daubree discovered some new peculiarities in meteoric iron. A polished plate of this substance dipped into an acid may be considered as constituting a voltaic couple. The contact of the liquid with metallic substances which it attacks, unequally developes a current proceeding in the liquid from the impressionable metal to the unimpressionable one, and in the iron mass from the latter to the former. In Widmanstætten's experiments, the existence of this current merely hastens the dissolution of the impressionable metal, but without manifesting its action to the eye of the observer. But the effect is very different when the solution of a metal capable of precipitation is substituted for the acid. The sulphate of bioxide of copper is admirably calculated to reveal the effect, on account of the colour of the copper, which contrasts with that of the iron. No sooner is the polished plate immersed into the saline solution, than the network formed by the needles of the phosphuret of iron and nickel appears in red on the white surface of the pure iron A moment later, a sort of copper ring is deposited round each of the coppered needles; and immediately after, an instantaneous deposit of copper covers the whole surface, which, until then, had remained bare. If this surface be now washed with ammonia, to get rid of the copper, the schreibersite reappears with its long parallel needles, and surrounded with the oblong rings that now appear whiter than the rest of the mass, which has assumed a greyish tint.

Composition of Aërolites.

There is an interesting article on aëroliths by M. Stanislas Meunier, from which the following facts are gleaned. Among the meteorites in which iron is reduced to the state of particles disseminated throughout a silicated mass, the blocks of the Sierra de Chaco, in the desert of Atacami, Chili, deserve particular notice, as being particularly rich in metallic particles. The point where they are to be met with is, according to M. Domeyko, situated at 10 leagues south-east of the silver mines of La Isla, near the copper mines of Taltal. The largest are slightly imbedded in the soil, and are of an irregular spheroidal shape. Their density, according to M. Domeyko, who has devoted much attention to them, is 5·64. They contain three different substances, viz. :—1, a lithoid ash-grey substance, constituting the principal mass : 2, a malleable metal in tuberculous grains ; and 3, a vitreous lamellated silicate of great brilliancy. The fracture of the first of these substances has a somewhat shining surface, as if it were resinous. If reduced to powder the magnet will separate from it about 15 per cent. of iron dust, consisting of oxide and pure or carburetted metal. The lithoid mass also contains protosulphuret of iron; acids will partially attack it, the soluble part is a double trisilicate of magnesia and iron, known under the name of "shepardite." The metallic particles disseminated throughout the mass consist of about 89 parts of iron and 11 of nickel, with traces of calcium and phosphorus. As for the lamellated silicate, it is soluble in acids, and contains a little lime and alumina, silica, protoxide of iron, and magnesia, in the proportion constituting peridote. Among the meteorites of our museums there are some bearing a strong analogy to each other; these constitute a separate group, called "the common type." These, when not broken, have a dull and fretted crust or varnish ; their fracture, however, is granulated and gray, and the general appearance is that of certain finely grained domites or trachites, although their composition is quite different, the common type of aëroliths consisting chiefly of nickeliferous iron.

Are Comets and Meteors identical.

At the recent meeting of the British Association this new theory was prominently put forth by Professor A. Herschel. The November and August meteors are found to move in orbits coincident with those of well-known comets; therefore it is argued that comets and meteors are the same, or that "the meteoric particles are portions of the comet's tail, shreds of a dismembered mist, torn by the sun's disturbing action from the nucleus of the comet, and left upon its path like embers or smoke-flakes in the track of an expiring flame." All this may be very sublime, but it seems to be rather a jump at a hasty conclusion. There is nothing surprising in the alleged coincidence in the orbit of certain meteoric swarms with that of comets. Both are *erratic* bodies, and therefore it is but reasonable that their courses should be alike. But the nature of the bodies is totally different, if we may believe what we find recorded by the most eminent astronomers. Comets have been described as nothing more than a conglomoration of vapours, of very little density, so little perhaps as to be transparent—stars having been seen even through their nucleus, or most brilliant, and, apparently, solidest part. Such bodies might very possibly be incipient worlds, just passed their gaseous state, and which are to derive solidity from the participation and condensation of the matter surrounding them. But our meteors are manifestly fragmentary bodies, just as indicative of a disruption or breaking into pieces as the fragments of rocks in a quarry. They are described as being composed more or less of silica (flint), oxide of iron, magnesia, oxide of nickel, sulphur, and lime—all which are substances which Professor Tyndall would say have been *dead* long ago—just as the same substances on our earth. Moreover, that wonderful thing, *carbon*, has been detected in them. Now, the presence of carbon anywhere necessarily implies at least *vegetation;* and therefore it is quite reasonable to conclude that the meteoric fragments containing it must have formed part of an earth constituted similarly to our own, but subsequently disrupted, shattered into fragments. Our moon may be only a larger block of such a dismembered world, large enough and endowed with just sufficient velocity to become a companion to our earth in her orbit, without tumbling upon her, like so many of the smaller fragments. Such are a few of the considerations which seem to militate against this new Meteor-Cometic Theory—especially as

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For further particulars, see January number.

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astronomers seem to agree in considering the hundred asteroids between Mars and Jupiter as "bits of planets blown to pieces," together with the fact, common with the meteors, "that some of them appear not to be round," as other bodies in the firmament.—*People's Magazine*, Nov.

THE FOOD OF THE ROBIN.—*FURDUS MIGRATORIUS.*—LINNÆUS.

At a meeting of the Boston Society of Natural History (America) a communication was read from Professor Tredwell, of Cambridge, giving a detailed account of the feeding and growth of this bird, during a period of thirty-two days, commencing with the 5th of June. The following is the substance of this report :—

When caught, the two were quite young, their tail feathers being less than an inch in length, and the weight of each about twenty-five pennyweights, less than half the weight of the full-grown birds. Both were plump and vigorous, and had evidently been very recently turned out of the nest.

He began feeding them with earthworms, giving three to each bird that night. The second day he gave them ten worms each, which they ate ravenously. Thinking this beyond what their parents could naturally supply them with, he limited them to this allowance. On the third day he gave them eight worms each in the forenoon, but in the afternoon he found one becoming feeble, and it soon lost its strength, refused food, and died. On opening it he found the provenbriculus, gizzard, and intestines entirely empty, and concluded therefore, that it died from want of sufficient food, the effect of hunger being increased perhaps by the cold, as the thermometer was about sixty degrees.

The other bird, still vigorous, he put in a warmer place, and increased its food, giving it the third day fifteen worms, on the fourth day twenty-four, on the fifth twenty-five, on the sixth thirty, and on the seventh thirty-one worms. They seemed insufficient, and the bird appeared to be losing plumpness and weight. He began to weigh both the bird and its food, and the results were given in a tabular form. On the fifteenth day he tried a small quantity of raw meat, and, finding it readily eaten, increased it gradually, to the exclusion of worms ; with it the bird ate a large quantity of earth and gravel, and drank freely after eating. By the table, it appears that though the food was increased to forty worms, weighing twenty pennyweights, on the eleventh day the weight of the bird rather fell off, and it was not until the fourteenth day, when he ate sixty-eight worms, or thirty-four pennyweights, that he began to increase. On this day the weight of the bird was twenty-four pennyweights ; he therefore ate forty-one per cent. more than his own weight in twelve hours, weighing after it twenty-nine pennyweights, or fifteen per cent. less than the food he had eaten in that time. The length of these worms, if laid end to end, would be about fourteen feet, or ten times the length of the intestines.

To meet the objection, that the earthworm contains but a small quantity of nutritious matter, on the twenty-seventh day he was fed exclusively on clear beef, in quantity twenty-seven pennyweights. At night, the bird weighed fifty-two pennyweights, but little more than twice the amount of flesh consumed during the day, not taking into account the water and earth swallowed. This presents a wonderful contrast with the amount of food required by the cold-blooded vertebrates, fishes, and reptiles, many of which can live for months without food, and also with that required by mammalia. Man, at this rate, would eat about seventy pounds of flesh a day, and drink five or six gallons of water.

The question immediately presents itself, how can this immense amount of food, required by the young birds, be supplied by the parents ? Suppose a pair of old robins, with the usual number of four young ones. These would require, according to the consumption of this bird, two hundred and fifty worms, or their equivalent in insect or other food, daily.

Suppose the parents to work ten hours, or six hundred minutes, to procure this supply ; this would be a worm to every two and two-fifths of a minute, or each parent must procure a worm or its equivalent, in less than five minutes during ten hours, in addition to the food required for its own support.

After the thirty-second day, the bird had attained its full size, and was intrusted to the care of another person during his absence of eighteen days. At the end of that period, the bird was strong and healthy, with no increase of weight, though its feathers had grown longer and smoother. Its food had been weighed daily, and averaged fifteen pennyweights of weight, two or three earthworms, and a small quantity of bread, each day, the whole being equal to eighteen pennyweights of meat, or thirty-six pennyweights of earthworms, and it continued up to the time of the presentation of the report. The bird having continued in confinement, with certainly much less exercise than in the wild state, to eat one-third of its weight in clear flesh daily, the Professor concludes that the food it consumed when young was not much more than must always be provided by the parents of wild birds. The food was never passed undigested ; the excretions were made up of gravel and dirt, and a small quantity of semi-solid urine.

He thought that every admirer of trees may derive from these facts, a lesson, showing the immense power of birds to destroy the insects by which our trees, especially our apple-trees, elms, and lindens, are every few years stripped of their foliage, and many of them killed.

"The food of the robin," the Professor says, "while with us, consists principally of worms and various insects, their larvæ and eggs, and a few cherries. Of worms and cherries they can procure but few, and those during but a short period, and they are obliged, therefore, to subsist principally upon the great destroyers of leaves—canker-worms, and some other kinds of caterpillars and bugs. If each robin, old and young, requires for its support an amount of these equal to the weight consumed by this bird, it is easy to see what a prodigious havoc a few hundred of these must make upon the insects of an orchard or nursery.—*Edward A. Samuels' Ornithology of New England.*

THE LUMINOSITY OF THE SEA.

I WOULD classify all the cases of luminosity which have come under my observation under the following five heads:—

1. Sparks or points of light.
2. A soft, liquid, phosphorescent effulgence.
3. Moon-shaped patches of steady light.
4. Instantaneous recurrent flashes.
5. Milky sea.

The first of these, or the appearance of points or sparks of light, is by far the most common, and in different degrees may be said to be all but universal. Whether the other forms of luminosity are exhibited or not, sparks of light in greater or less abundance are scarcely ever absent. The sea, more particularly when agitated, sparkles with brilliant points of light, varying in size from that of a pin's head to that of a pea—and of greater or lesser permanency—some being almost instantly extinguished, while others retain their light for an appreciable time. I do not think I ever looked at the sea on a dark night without seeing some few sparks, even though I might enter a remark that the sea was "*not* luminous to-night." But usually these sparks are abundant, and on occasions they present a wonderfully brilliant appearance. On one occasion, when this phenomenon was unusually striking, on the coast of China in lat. 26° N., on drawing up bottles full of water and pouring it out in the dark, the water sparkled brightly as luminous points ran over, but a close inspection revealed nothing in the water but a few minute entomostraca. On another occasion when some water which had been left in a basin exhibited luminosity at night, I got a very brilliant spark upon my finger, and taking it to the light, it proved to be a minute crustacean.

The second form of luminosity to be noticed occurs comparatively rarely. It consists of a soft, usually greenish light, which only makes its appearance when smooth water is disturbed, and is only seen in calm weather. This form appears identical with what we see nearer home, as on the shores of Ostend and in the estuary of the Mersey. This form of luminosity I have observed on only three occasions, and under similar circumstances, and I have reason to believe that the cause is the same on all occasions, whether in the Eastern seas or in the Mersey. On the 5th of July being on the coast of China, in lat. 27°, the weather in the afternoon became dead calm, and after sunset I remarked that the sea was beautifully luminous, but altogether without conspicuous sparks or points of light. Wherever the ripples caused by the advancing ship rolled away, they were crested with bright green light, and the ship's hull appeared to be enveloped in a luminous sheath. On this occasion the effect did not last long, and I did not examine the water microscopically.

The next time I noticed this form of luminosity was in Singapore harbour, on November 6th. The wind was east, thermometer 76°, weather fine. The water was like glass, smooth and beautiful, but exhibited no light except when disturbed; but every oar-stroke of the boat in which I rowed produced eddying circles of light, and a lovely soft green glow crowned every ripple from the bows. A splash in the water produced a shower of a myriad minute sparks, the aggregate of which made up this delicate luminosity, which I never saw so beautifully exhibited as upon this night. The following night the same effect was visible, but scarcely so intense as before (wind N.E., temp. 76°), and on the third night (the wind being E. and temp. 75°), I again observed it. After this I was absent from Singapore two nights, and on my return I no longer noticed the luminous effect.

On each of these three nights I examined the water;—as I filled a bottle, bright sparks of light adhered to my hands, and on bringing it to the light I found that it contained a number of small globular greenish bodies, which floated upon the surface for the most part, but appeared to have the power of freely moving in the water. On closer examination these bodies proved to be *Noctilucæ;* and during the night I observed that the contents of the bottle frequently flashed with bright and rapid coruscations. I had no difficulty therefore in coming to the conclusion that the peculiar luminosity in the harbour was due to the presence of innumerable *Noctilucæ.*

On the 24th of May, lying in Simon's Bay, Cape of Good Hope, the water was similarly luminous. The weather was fine, wind W.N.W. light, bar. 30·04, thermom. 60°. On examining the water closely I found that, as before, the luminous effect, though soft, subdued, and apparently uniform, was really due to innumerable small sparks, and on bringing the water to the light, I found numerous *Noctilucæ* in it, precisely similar to those observed at Singapore. They were not, however, in sufficient numbers to have produced all the light, for in a wineglassful of water there were on an average not more than a dozen *Noctilucæ*. But besides these bodies, there were a great number of motes in the water, many of which on closer examination appeared, by their rapid jerking locomotion, to be minute Entomostracous Crustacea. They were so minute, that by the imperfect light on board ship I long tried, in vain, to secure one to place under the microscope. Besides these were some larger species of Entomostraca.

The *Noctilucæ* measured from $\frac{1}{275}$ to $\frac{1}{325}$ of an inch in diameter; they were of a pale greenish colour when seen with the naked eye, closely resembling Volvox in appearance, but with a much less active movement. They had, however, powers of locomotion, though the means were not apparent under the microscope. They had a dark nucleus, usually irregular, but in some cases spherical and well defined. Their circumferential outline was very faint, and their general aspect very variable. A kind of slit appeared to extend through two-thirds of the body, from which faint lines radiated, usually having a double outline, and not reaching the circumference of the sphere, but often terminating in large round granular bodies of various sizes. The whole body was studded with oil globules of various sizes, which strongly refracted the light; but slight movements, which appeared to be taking place in an almost imperceptible manner, soon changed the whole aspect of any individual Noctiluca while under observation, so that the description or drawing of one minute did not answer for the next. Each Noctiluca had a large curved cilium projecting beyond the body, and apparently taking its rise from the nucleus. This form of luminosity, although very striking, appears to be completely extinguished by moonlight, even when the moon is young. It appeared, only less marked, on the two following evenings, and on the third we left the bay. I am informed that Simon's Bay has been remarked as frequently exhibiting this phenomenon.

On the 7th of July, in lat. 28° N., on the coast of China, two days after the occurrence of this form of luminosity, as before noticed, a heavy swell coming in from the S.W. was met by a N.E. wind, and the ship rolled tremendously. The sea was beautifully luminous, every wave breaking into a pale light which was visible at a considerable distance, so that the whole sea was streaked with light, and again that peculiar phenomenon of the ship sailing in a luminous sheath was visible. The night was very dark, and it was lightning vividly and incessantly; the whole scene was eery and weird in the extreme. I mention this case because it was one of the most striking instances of general luminosity which has come under my notice; it appeared to be compounded of the two forms I have already described.

The third form of luminosity to be described consists of moon-shaped patches of steady white light, which I have found to be a very common phenomenon under certain circumstances. Next to the occurrence of sparks and always accompanied by them, this form of luminosity is most frequently seen, and does not appear to be confined to any particular locality. I first observed it in the Mediterranean, on the first night on which the absence of the moon allowed it to be visible, and I have since found it to be no less frequent in the Red Sea, the Indian Ocean, the China Sea, and the Atlantic, north and south of the equator. It is most commonly visible in the wake of the ship, and consists of numerous round patches of light, which might be mistaken for white-hot shot of various sizes beneath the water at different depths. Sometimes, when deep down, they were pale and of a whitish colour, with indistinct outline, and of large size, but when nearer the surface they were smaller and more distinct, and assumed a pale greenish tinge. They usually remained visible for eight or ten seconds, but sometimes less. As these appearances were just such as might be presented by the umbrellas of large *Medusæ*, were such present and luminous, I was strongly inclined at first to attribute them to this cause; and the fact that on one occasion (about a week after I left England) I saw these moonlight patches in the Red Sea on the evening of a day on which the ship had passed through a shoal of *Aureliæ*, led me to attribute them to this cause. I supposed that the *Aureliæ*, struck by the screw, gave out their light under the excitation of the blow, and floated away luminous and dying. But I was forced to abandon this theory afterwards, for I have since many times watched for floating *Medusæ* before the light failed, and not seen one for days and weeks together, and yet the moon-shaped patches have been as bright and as abundant as before; and again, when we have passed through a thick shoal of *Medusæ* towards evening, the luminous appearances have not been more marked than usual, but even less so. Moreover, having secured one of the Acalephs, it has not exhibited any luminosity during the night.

Although, however, I ceased to regard the *Acalephæ* as the source of the luminous appearances in question, there can be no doubt that the great numbers which are always visible immediately under the stern are due to the fact of the eddies of the ship exciting the emission of light in certain animals capable of exhibiting luminosity. Not however that similar appearances are never seen in other situations where they are unmolested, though I must say that in my experience this is rare. Thus in the Indian ocean, in lat. 12½° N. and long. 55° E. (bar 30°, them. 82°), among other appearances I noticed now and then a large patch of light with a roundish irregular outline pass by, emitting a pale and steady light, although out of the path of the ship; and on August 17th, being in a small boat on the coast of Borneo in a strong breeze after dark, I observed deep beneath the surface and entirely apart from any influence of the oars, the appearance of large globes of white light, shining persistently and spontaneously.

Although I long and constantly watched for the bodies which produced this remarkable and frequent luminous effect, I did so for a long time in vain. In vain I attempted to penetrate below the surface in search of any animals which could possibly originate the light. Although I could distinctly see the bottom of the ship's rudder, 19 feet deep, I could never detect a trace of any living thing within that depth by day, but no sooner did darkness supervene than they were often in abundance. It was only by accident, on June the 2nd, in lat. 28½° S., and long. 9° E., that I was witness of a circumstance which seemed to elucidate the question. Looking as usual over the stern, there were plenty of moon-shaped patches, accompanied by sparks unusually large and bright. The patches were remarkably persistent, and could be traced for nearly half a minute after the ship had passed. They were evidently a considerable but varying distance below the surface of the water; when far down they appeared large and faint and ill defined, but when nearer the surface they were smaller, brighter, and better defined. As I watched, one of the bright bodies whirled about by the eddy of the rudder came absolutely to the surface and exhibited a nearly rectangular form of great brilliancy, of a pale green colour, and as far as I could judge about six inches long by two broad. It at once occurred to me that it was a Pyrosoma, and that this Ascidian was the usual cause of the phenomenon, the circular form of the patches being produced by the diffusion of the light through a depth of water. I continued watching for a long time in hopes of seeing another, but although so good an opportunity did not occur again, many seemed to come near the surface, diminishing in size, but increasing in brilliancy as they did so; one particularly low down suddenly gave out a dazzling brilliancy, producing a momentary effulgence all around.

I may mention that on a moonlight night when the moon has been dimmed by fleecy clouds, I have been able to see the moonlight patches, but when the moon shone out clearly they were no longer visible.

I have now to describe the fourth form of luminosity exhibited by marine animals, *viz.* momentary recurrent flashes of light. This form is nearly as commonly seen as the moon-shaped patches already described, which it very frequently, although perhaps not always, accompanies. If, however, the latter are well marked, the flashes are almost sure to be visible. I first observed them in the Indian ocean, north of the line, and since then, in the China seas and Atlantic. This appearance is very striking, but can only be seen under favourable circumstances, *i. e.* when the night is dark and the sea smooth. An indistinct transitory patch of light appears in the water, as evanescent as a flash of lightning; so rapidly does it come and go that it is difficult to fix the exact spot where it occurred. The brightness of the flash varies probably according to the depth of the animal producing it below the surface; sometimes it is of considerable brilliancy, and sometimes so pale that it would not have been noticed but for its suddenness. The colour is always whitish, and the form of the flash round, brightest in the middle, and becoming indistinct at the circumference. I have on some occasions seen these flashes occur in such numbers and with such rapidity that it would be impossible to count them, though more commonly they are comparatively few and far between.

But the fact which interested me most in these flashes of light was that they always occurred at a distance from the path of the ship. Although I have seen them accompanying the moon-shaped patches of light in the ship's wake, the places from which I could best observe the flashes were the forecastle or the gangways, when they could be seen in the smooth water several yards distant from the ship's side, and entirely uninterfered with by the ship's motion. This fact proved to me that there were spontaneous emissions of light by some animals below the surface, which voluntarily and at intervals gave out a bright coruscation. Moreover, although rarely, on following with the eye the spot where the flash appeared, it could be seen to reappear further astern, as though the emission was recurrent at different intervals, as is the case with the luminous beetles called fireflies at Singapore. I have also noticed on more than one occasion that the flash, instead of instantly disappearing, was followed by a faint glow which vanished gradually, but whether this was an optical illusion of the retina or not, I cannot be sure.

Whatever may be the animals which produce these luminous appearances, they must habitually swim at a considerable depth. I never was able to make out any definite outline of the light, which always appeared more or less spherical with faint edges, and sometimes the size and faintness of the flashes seemed to prove that the light must have been diffused by its passage through a great depth of water, which would also account for the whitish appearance of what is probably really greenish light. But I am strongly disposed to believe that the sources of the flashes and of the moon-shaped patches are identical; in the one case emitting their light spontaneously, and in the other, under the excitation of the eddies produced by the ship, and especially by the screw-propeller when at work.

Before quitting the subject of these flashes, I must not omit to mention that while at Singapore, having taken some small *Medusæ* in a towing-net in the Straits, I placed them in a glass which stood by my bedside. In the night I observed them flashing brightly with instantaneous flashes, of the same character as those above referred to, although not the slightest shaking was applied to the bottle, or irritation to the animals. So also the *Noctilucæ* of Singapore harbour, which I kept similarly in a bottle, flashed frequently with rapid and bright coruscations; and I am strongly disposed to believe that luminous marine animals in health, and acting spontaneously, without external irritation, always exhibit their luminosity in this manner, and that it is only when strong excitation is applied that they give out a steady but temporary glow.

There remains but one form of luminosity to be noticed, which although I have never been so fortunate as to witness it myself, has been observed by others, who have been longer at sea than I. This is what has been called *milky sea,* an extraordinary phenomenon of rare occurrence. It has been described to me as a general luminous glow, not confined to the crests of ripples or to disturbed water, but occurring in perfectly calm weather, and looking as though the whole sea was composed of a whitish fluid like milk, with no bright spots or sparks. Such an appearance reflecting a faint light upwards illuminates the ship, rendering every part of the rigging plainly visible, and inasmuch as it can only be seen in the absence of the moon, the contrast of the white glowing sea with the black sky produces an effect calculated to strike the observer with a kind of awe. Although I have met with persons who tell me they have not unfrequently seen this phenomenon, I am disposed to believe that it is extremely rare. One who has not really seen it all might erroneously suppose, that such an appearance as I have already alluded to as having twice occurred to me on the coast of China (when the ship seemed to be sailing in a luminous sheath) corresponded to the description of a milky sea, and in a small way it did so, and I considered it at the time as the nearest approach to it I had ever observed. But the milky sea must be something *sui generis*, and I imagine it to be owing rather to a condition of the water under certain peculiar atmospheric or climatic influences than to any extraordinary number of luminous animals in the water. A circumstance which occurred to me seemed to throw some light upon the subject and confirmed me in this opinion. Having put down the towing-net in the Formosa Channel it collected a number of small entomostraca, megalopas, minute medusæ, small porpitæ, pteropods, annelids, globigerinæ, &c., which I placed in a basin of sea water, and not having finished my examination of them they remained upon the table during the night. On stirring the water in the dark the whole became faintly luminous, giving out a general glow as if every particle were phosphorescent, the minute crustacea, &c., appearing as bright spots in the luminous fluid. If the slimy substance, in which in some marine animals at least the luminous property appears to reside, become diffused through the water, as it is probable it may be under certain combinations of conditions and circumstances, a general luminosity of the water may result, similar to that observed in milky sea, while its small sparks, doubtless in great abundance, would remain unnoticed in the universal glow, but would at the same time greatly enhance the general luminous effect.—*The Quarterly Journal of Science*, October. London: Churchill.

THE CLOTHES-MOTH.

FOR over a fortnight we once enjoyed the company of the caterpillar of a common Clothes-moth. It is a little pale delicate worm about the size of a darning needle, not half an inch long, with a pale horn-coloured head, the ring next the head being of the same color, and has sixteen feet, the first six of them well developed and constantly in use to draw the slender body in and out of its case. Its head is armed with a formidable pair of jaws, with which, like a scythe, it mows its way through thick and thin.

But the case is the most remarkable feature in the history of this caterpillar. Hardly has the helpless, tiny worm broken the egg, previously laid in some old garment of fur, or wool, or perhaps in the hair-cloth of a sofa, when it proceeds to make a shelter by cutting the woolly fibres or soft hairs up into bits, which it places at each end in successive layers, and joining them together by silken threads, constructs a cylindrical tube of thick, warm felt, lined within with the finest silk the tiny worm can spin. The case is hardly round, but flattened slightly in the middle, and contracted a little just before each end, both of which are always kept open. The case before us is of a stone-grey color, with a black stripe along the middle, and with rings of the same color round each opening. Had the caterpillar fed on blue or yellow cloth, the case would, of course have been of those colors. Other cases, made by larvæ which had been eating "cotton wool," were quite irregular in form, and covered loosely with bits of cotton thread which the little tailor had not trimmed off.

Days go by. A vigorous course of dieting on its feast of wool has given stature to our hero. His case has grown uncomfortably small. Shall he leave it and make another?—No housewife is more prudent and saving. Out come those scissor-jaws, and, lo! a fearful rent along each side of one end of the case. Two wedge-shaped patches mend the breach,—caterpillar retires for a moment; reappears at the other end; scissors once more pulled out; two rents to be filled up by two more patches or gores, and our caterpillar once more breathes freer, laughs and grows fat upon horse hair and lamb's wool. In this way he enlarges his case till he stops growing.

Our caterpillar seeming to be full-grown, and hence out of employment, we cut the end of his case half off. Two or three days after, he had mended it from the inside, drawing the two edges together by silken threads, and, though he had not touched the outside, yet so neatly were the two parts joined together that we had to search for some time with a lens, to find the scar.

To keep our friend busy during the cold, cheerless weather, for it was in mid-winter, we next cut a third of the case off entirely. Nothing daunted, the little fellow bustled about, drew in a mass of the woolly fibres, filling up the whole mouth of his den, and began to build on afresh, and from the inside, so that the new-made portion was smaller than the rest of the case. The creature worked very slowly, and the addition was left in a rough, unfinished state.

We could easily spare these voracious little worms hairs enough to serve as food, and to afford material for the construction of their paltry cases; but that restless spirit that ever urges on all beings endowed with life and the power of motion, never forsakes the young Clothes-moth for a moment. He will not be forced to drag his heavy case over rough hairs and furzy wool, hence he cuts his way through with those keen jaws. Thus, the more he travels, the more mischief he does.

After taking his fill of this sort of life he changes to a pupa, and soon appears as one of those delicate, tiny, but richly variegated moths that fly in such numbers from early in the spring until the fall.

Very many do not recognize these moths in their perfect stage, so small are they, and vent their wrath on those great millers that fly around lamps in warm summer evenings. It need scarcely be said that these large millers are utterly guiltless of any attempts upon our wardrobes, they expend their attacks in a more open form on our gardens and orchards.

We will give a more careful description of the Clothes-moth which was found in its different stages June 12th in a mass of cotton-wool. The larva is white, with a tolerably plump body, which tapers slightly towards the tail, while the head is much of the color of gum-copal. The rings of the body are thickened above, especially on the thoracic ones, by two transverse thickened folds. It is one-fifth of an inch-long.

The body of the chrysalis, or pupa, is considerably curved, with the head smooth and rounded. The long antennæ, together with the hind legs, which are folded along the breast, reach to the tip of the hind body, on the upper surface of each ring of which is a short transverse row of minute spines, which aid the chrysalis in moving towards the mouth of its case, just before the moth appears. At first the chrysalis is whitish, but just before the exclusion of the moth becomes of the color of varnish.

When about to cast its pupa-skin, the skin splits open on the back, and the perfect insect glides out. The act is so quickly over with, that the observer has to look sharp to observe the different steps in the operation.

Our common Clothes-moth, *Tinea flavifrontella* is of an uniform light-buff color, with a silky iridescent lustre, the hind wings and abdomen being a little paler. The head is thickly tufted with hairs and is a little tawny, and the upper side of the densely hirsute feelers (*palpi*) is dusky. The wings are long and narrow, with the most beautiful and delicate long silken fringe, which increases in length towards the base of the wing.

They begin to fly in May, and last all through the season, fluttering with a noiseless, stealthy flight in our apartments, and laying their eggs in our woollens.

There are several allied species which have much the same habits, except that they do not all construct cases, but eat carpets, clothing, articles of food, grain, etc., and objects of natural history.

Successive broods of the Clothes-moth appear through the summer. In the autumn they cease eating, retire within their cases, and early in the spring assume the chrysalis state.—A. S. Packard, in the *American Naturalist*, October.

EFFECTS OF LIGHTNING.

A LARGE proportion of mankind, and I may say the whole of womankind, regard such thunderstorms as those which raged over many parts of England last August with strong feelings of trepidation and alarm, manifestly betrayed while the tempest wears its most furious aspect, but not always confessed to after it has passed away. There is a wide-spread opinion existing—and one which is doubtless the cause of half the fears that thunder-storms engender—that lightning strokes are always fatal to life; but this is very seldom actually the case. Upon the average not more than twenty persons are killed by lightning in the United Kingdom in the course of a year—a very small proportion of the half million of deaths from all causes that make up the total of our annual bill of mortality, or even of the fifteen thousand violent deaths that are registered during the same period. In France this average is much greater, and in Belgium much less, regard being had in each case to the difference of population. But of victims to lightning strokes not fatal to life there are no statistics; the numbers of such must be very great, for scarcely a thunder-storm occurs without our hearing or reading of some one or more accidents arising from it; the number of reported cases is doubtless but a per-centage of those which are unrecorded, and we may certainly assume that hundreds, and possibly conjecture that thousands of slight injuries are inflicted by these powerful electric shocks in the course of a stormy year.

The injuries which lightning causes to the human body are sometimes very curious, quite sufficiently so, I have thought, to render a few cases worth recounting. The whole subject has at times received great attention from scientific men, and a few months ago an exhaustive work upon the effects of lightning upon all animate and inanimate objects issued from the French press. It represented the life's labour of a physician, M. Sestier, who died before it was fit for publication; to it we are indebted for some of the materials of this article.

The most palpable injuries are those which are external, and leave their marks upon the skin of the victim. It sometimes happens that the surface of the body is marked by a sort of film or plaster, something like the oxide that covers stones and metals that have been affected by the electric discharge, and which arises from the transport of ponderable matter collected by the lightning in its course through the air, and left at the surface of the body penetrated by it. This film is so superficial that it has been removed by slight friction, and it has been proved in some cases to arise from matter gathered from something borne by the person injured. For instance, a lady wearing a gold chain was struck; the chain was melted, and her neck and breast were stained with a purple oxide of gold, while a band or stream of the same dye ran down her body. It has frequently happened, too, that designs and figures of natural objects have been as it were photographed, or more properly electrographed, upon the surface of the skin. A sailor asleep at the prow of a vessel was attacked by the electric fluid, and it was afterwards discovered that the number "44" had been imprinted upon his breast, these figures having been marked upon a sail that the fluid had penetrated before reaching the man. A minister's house was struck, and several persons were injured; the wife received a slight infliction, and strangely enough her right arm was impressed with the image of a red flower that formed the pattern of her dress. Three men were gathering pears when the lightning fell upon them; one was killed, the others stunned; when one of the latter came to himself, he found the branches and leaves of the tree distinctly imprinted upon his body.

The hair of the head and body seems to be frequently subject to destruction. This would not be remarkable, if it was in all cases entirely singed off, for we know that in gas and other explosions, where a man is surrounded by flames, the hair and eyebrows are frequently destroyed; but the lightning is more capricious in its effects. Arago tells of a captain of a frigate who related to him how that his vessel was struck by lightning, and he received several wounds in the head. "Next day," said the captain, "when I wanted to shave myself, I found that the effect of the razor on the beard was to pull it out by the roots, instead of cutting it. . . . The hair on my head, my eyebrows and eyelashes, successively came out in the same way by the roots, and did not grow again." The year after this happened, the captain's finger-nails scaled away. A German physician has recorded a case where a young man had the hair from a space on his head, the size of a five-franc piece, as completely and cleanly shorn as if it had been done with a pair of scissors; and another authority quotes that of a labourer, who had three or four tonsures made by lightning, where the hair was as neatly removed as though it had been shaven by a razor, the skin showing no sign of injury.

Next to the fear of death from lightning, without doubt that of perpetual blindness has the firmest hold upon the popular mind; but here again an examination of actual numbers proves this fear to be exaggerated. Without doubt the sudden flood of intense light into the eye, which only the lightning flash can give rise to, and the strain upon the nerves and muscles of that organ thereby produced, so far paralyses the vision that amaurosis, or temporary blindness, or hemiopsy—partial blindness—is the consequence. There is abundant evidence of this; I myself witnessed a case during the past year. One or two cases in which cataract has resulted from fulguration are likewise on record. But of lasting blindness it is doubtful whether any authenticated instance exists. M. Sestier, in summing up his experiences upon this branch of his researches, and leaving out those cases where the loss of sight has been but momentary, finds only fourteen cases where the blindness has had anything like a notable duration, and of these there are only four instances of its enduring for many days, the longest period in any one case being seven months. He says that he knows of no instance of blindness which has lasted during many years.

Shocks to the nervous system, as may be supposed, are very frequent and of varying violence; they last sometimes but a few minutes, most frequently about a day, and, on very rare occasions, for a longer period, insensibility having lasted even for a week after the shocks occurred. Frights and extravagant actions consequent upon them are too numerous to be dwelt upon; losses of memory are common, and complete changes of disposition and temperament occasional. Paralysis is one of the most frequent consequences. The part of the body affected is generally that which has received the lightning spark, and through which the electric fluid has traversed on its way to the earth, and, as a consequence, the lower members of the body are more frequently afflicted than the upper parts; strangely enough there seems to be a tendency on the part of the left half of the body to become paralysed more often than the right. Is it because there is more life and vigour to resist injury in the right than in the left side? It would appear so. The paralysis, like the nervous affections, is generally of short duration. A telegraph clerk, who was struck in Scotland on the 20th of August last, had both arms paralysed for three hours. In about forty in a hundred of the cases enumerated by M. Sestier, the duration was within twenty-four hours; though it has been known to last for several months. A remarkable case of temporary prostration of a large number of people is offered by a storm which passed over some grounds where a fair was being held, at Springville, Erie, in the United States, on the 27th of June last. One of the exhibition sheds, in which the spectators had taken refuge from the rain, was struck by lightning, and about one hundred persons were stunned and prostrated, in almost every case falling on their faces; some fifty remained insensible for five or ten minutes, a dozen were seriously burned, three or four injured so as to be considered past recovery; but two horses, and these only, were killed outright. It was conjectured at the time that the roof of the building acted as a sort of "distributor" of the electricity, and that each person's head drew off a portion of the charge; but it seems as probable that the poor horses received the full charge, and that the people were influenced by their proximity to the course of the current; for it is proved that it is not necessary to be actually struck to be affected by lightning; many accidents have happened to individuals merely in the neighbourhood of stricken objects. At Borlington, a few years back, two persons were paralysed in the same house in which another two were killed.

Considering what I have said, and what I have still to say, of the evil effects of lightning, it is a pleasant change to have to adduce some instances of its opposite or beneficent influence. The doctrine that "likes cures likes" holds good in the case of maladies to which the destructive element gives birth; whether the fright, or some proper action of the electric fluid works the cure, it is hard to say; but the effect is incontestable. Several cases are reported where individuals, paralysed from their youth, have recovered complete use of their limbs by lightning strokes in after years. A country clergyman, in Kent, was paralysed by apoplexy in 1761, and struck by lightning about a year after, when all traces of the paralysis left him. A man who had lost the use of both arms was guarding some animals in a field; lightning fell upon him, and when he came to his senses, he found that he could use both arms and hands. These are but a few out of many recorded instances. A variety of ailments besides paralysis have been cured or ameliorated by the same agency, even blindness; for one Gardley, some time an actor at the Surrey Theatre, who had been for many years blind of one eye, had his sight quite restored by a lightning-flash.

The question has often arisen whether a lightning-stricken man sees the flash that smites him, or hears the thunder that follows. It may be answered in the negative: so instantaneous is the effect of the sudden shock that the mind must be deprived of the power of receiving any impression concerning the cause of it. Those who have been so far injured as to lose consciousness, and have afterwards recovered, have generally, I may say always, asserted that they saw nothing, heard nothing, and even thought nothing—in fact, that they knew absolutely nothing of what had happened, and have wondered how it came to pass that they found themselves prostrated. This phenomenon accords with the testimony of those experimentalists in electricity who have been occasionally overthrown by powerful shocks. Franklin, for instance, received in his head the discharge of two large Leyden jars. He fell down senseless in an instant; when he became conscious, he wondered how he came to be on the floor, and so innocent was he of what had happened that he actually thought the jars still contained the fluid, and he set about experimenting with them, when his assistants told him that he had himself been the recipient of their contents. In the majority of cases a body lightning-struck falls gently to the ground; the limbs appear to lose their rigidity, and give way beneath the superincumbent weight; there is no violent overthrow. On this account it seldom happens that the victim exhibits any fractures or wounds such as it might be thought would be produced. But this rule has had some marvellous exceptions. On some occasions the body struck has been considerably displaced, and even transported to a distance from the spot where the flash fell upon it. In 1839 two carriers in the neighbourhood of Triel took refuge during a thunderstorm beneath the branches of an oak tree: the tree was struck, and the lightning attacked them; one dropped down on the spot, but the other was lifted and carried to a distance of twenty-five yards, and fell in a thicket of chestnut trees. An analogous case occurred near Chantilly:—A surgeon on horseback, overtaken by a storm, dismounted and took shelter beneath a tree, where a labourer had already located himself. The wind being very high, they huddled together, and held on to the tree. The lightning descended upon them; the labourer was thrown to a distance of six feet, the horse was moved about the same distance; but the doctor was carried up and hurled over a space equal to twenty-five paces. He was seen as a black mass in the air by some boatmen on a moat hard by.—James Carpenter in *Cassell's Magazine* for November.

EXTINCT ANIMALS.

THE saurians, or great pre-Adamite amphibious lizards are found in a fossil state in the English lias, and even in earlier geological formations. They must have abounded at a time when mammalian life was hardly developed. Of these saurians the emperor was the icthyosaurus, a massive monster 30 feet long, with a pendulous stomach, a fish-like tail, a crocodile's hideous head, and four fins like the paddles of a whale. Its skin was that of a whale; its eye was as big as a dinner plate, (18 inches in diameter,) protected by a bony-shield like that of a bird of prey; and its sternum was like the Australian duck rat, that most abnormal and incongruous of creatures. Its teeth were powerful as those of the modern crocodile, only there were about six feet length of them. Its fossilized dung is still often found in large quantities, and always contains remains of fish and reptiles. The icthyosaurus probably fed on its flabbier weaker brother, the plesiosaurus, which was less than 18 feet long, and a feebler and altogether more pot-like creature. It had a vertebral column like a fish, a short rudder tail, and four slender paddles; a long neck, and a small inoffensive head. Professor Owen, who can build up an animal from the bare hint of a single bone, thinks the plesiosaurus lived near the sea shore, and was in the habit of ascending estuaries.

As for the pterosaurus, which is found in the English lias, he was a strange creature, with wings slightly resembling the flying lizard, which has side membranes to support it while leaping from tree to tree. This saurian, found in the English lias, became extinct, it is conjectured, in the time of the chalk formation.

The pliosaurus was another chieftain of the dark and pre-historic ages. He was large as a whale, and had the ferocity and jaws of the crocodile. There were five genera of him. In some of them there were anatomic indications of tendency towards the mammalia structure. Some of these crocodile lizards were more aquatic, others more terrestrial. They are most of them found under the chalk in the wealden, or south-Eastern part of England. The megalosaurus, of from 25 to 35 feet long,—which had an enormous muzzle with strong teeth,—was the most formidable land creature of its age. The iguanodon, another monster of this dynasty of animals, was distinguished by a prehensile tongue. So much for the monsters who passed away as the Pharohs did after them. As the Cæsars went, so went the Saurians.

But let us by no means forget our big friend—that earth-shaker—that great grandfather of all the elephants: we refer to the mammoth. Who would ever have believed in him had not a real specimen been found potted in the ice of Siberia? Remains of fossil elephants are very numerous in what Lyell calls the pliocene period. Bones of elephants are found under the earth in almost all parts of both continents ; and the bones and tusks of the mammoth, or gigantic elephant, have always been common throughout Russia, particularly in Eastern Siberia and the Arctic marshes. The tusks, so numerous and so well preserved, long formed an article of commerce ; and although considered inferior to modern ivory, were extensively used in Asia and Africa : but still, no complete skeleton—much more a carcase—had been found. In 1799, however, a Tungusian fisherman named Schumachoff, after his sport was over, embarked on the Lake Oncoul, to seek for mammoth tusks round the shores. He came at last to a shapeless mass of ice, the nature of which puzzled him. In 1800, he found the same mass again—by this time divided into two parts, both projecting from the ice, and evidently distinct from it. Towards the end of 1801, it showed itself evidently to be the carcase of a huge animal, for now its one side and one tusk were free. In 1803, the ice between the earth and the mammoth had melted and down it fell on a bank of sand, probably rather overcome with standing for about a thousand years or so. In March, 1804, Schumachoff, steadily following up his big prize, was "down upon him" like a dog or a stag at bay. He now cut off the tusks and bartered them for 50 roubles' worth of goods. In 1806, a traveller visiting the enormous joint, which was, indeed, "cut and come again," found that the Jakutski had much mutilated it, by hewing off its flesh to feed their dogs ; white bears, wolves, wolverines, and foxes had also fed upon it, and there were traces of footsteps all round it. The skeleton, now almost bare, was still whole all but the fore leg. The head was covered with dry skin, and one ear was well preserved. The dark grey skin was covered with reddish wool and black hairs. The carcase was 9 feet 4 inches high, and 16 feet 4 inches long from point of nose to end of tail. The tusk measured along its singular curve 9 feet 6 inches, the two tusks weighing together 360lbs. ; and the head, with the tusks 414lbs. The skin of one side alone was so heavy that it took 13 men to carry it on shore. Thirty-one pounds of hair that had been torn off by the white bears were collected from the ground. Various other mammoth skeletons were traceable in the same locality, and mammoth's tusks were visible in great numbers in the hollows of the adjacent rocks.

The skeleton of the mammoth (certainly one of the wonders of the world) stands in a room by itself in the Great Museum of the Academy of St. Petersburg, dwarfing the spectators as a Colossus would do. Its great tusks, in whose curve several men could sit, are too much rounded and too much turned upwards to have been useful either for aggression or defence, and we may presume, like giants in story books, the beast was easily overcome by more swift and subtle, though smaller animals. Monster king of the early world, the mammoth must have trampled and munched his way about, enjoying himself after his fashion and biding his time for quiet extinction.

Some mammoth hair and skin given by Mr. Adams and Sir Joseph Banks to the Museum of the Royal College of Surgeons, is still to be seen there. The mammoth seems to have had two sorts of hair—common hair and bristles. That remaining on the skin is of the colour of camel's hair, one inch and a-half long, and very thick-set and curly. It is interspersed with a few bristles almost three inches long, and of a dark reddish colour. Some of these are nearly black, much thicker than horse-hair, and 12 to 18 inches long.

This stupendous creature appears to have existed in England also, and at a time, too, when the temperature was much the same as now, for his colossal remains have been found in the North Cliff, in Yorkshire, in a lacustrite formation, where all the land and water shells can be identified with the existing ones.

The bones of various ruminating animals, many of them allied to the ox and deer tribes, are very abundant in the gravel strata of many parts of England and the Continent. The most gigantic of the extinct deer was the elk, an animal whose skeleton is found in the east of Ireland and in the Isle of Man, embedded in the peat bogs. Owen selected the elk as the representative of a new sub-genus—the megaceros. Perfect skeletons of this huge deer are seldom found, but the detached bones are exceedingly common here and elsewhere. The head of an elk, in the Woodwardian Museum of Geology, in Cambridge, is five feet 6 inches high ; from the snout to the tip of the tail measures eleven feet, and between the tips of its horns nearly nine feet. This vast creature, with a forest upon its head, was to deer of the present epoch what the elephant is to the terrier.—*Leader*, Nov. 9.

THE RUBY-THROATED HUMMING BIRD. — *TROCHILUS COLUBRIS*— LINNÆUS.

THIS beautiful little winged gem is distributed throughout New England as a summer visitor. It arrives from the South from about the 15th to the 25th of May, according to latitude, and usually in pairs. The first notice that we have of his arrival, is a humming sound, and now and then a sharp chirp, like that of a large beetle, among the earliest flowers in the garden. We look in the direction of the sound, and perceive our little stranger darting about, and thrusting his bill and little head into the flowers, busily searching for the small insects that inhabit them, and which constitute the principal part of his food. While we are looking at him he suddenly alights on a twig, turns his gorgeous throat towards us, and scans us with his bright little black eyes. While he is perched, he busies himself in arranging his plumage, and cleaning from his feathers the drops of dew that have perhaps fallen upon him, uttering occasionally his merry chirp; presently his mate appears, and alights by his side. The little lovers (for they are still such) then indulge in mutual caresses, and apparently talk over with much earnestness, their plans for future housekeeping. Woe to another humming bird, if he comes in sight, for our little friend is not only jealous of his mate, but is very quarrelsome also, and protects his honour with great courage. As he darts off like a bullet at the intruder, his mate watches with no little interest for the results of the battle that is inevitable. The two males meet in the air, and fierce is the contest; their little wings beat the air with such force that their humming is heard at the distance of several rods : up they mount, rushing against and striking each other with their sharp little bills, until they are both lost to the sight. Presently our acquaintance descends to the twig where his mate is seated, and struts before her with a pride much larger than his body, apparently anxious for her approval of his courage. She caresses him, and, after he has adjusted his plumage, off they shoot for other scenes and pleasures.

About the first week in June, the Humming bird commences building its nest : this is composed of a soft down, that is taken from the stems of some of the ferns ; it is covered entirely with lichens, which are glued on with the saliva of the bird, giving it the appearance of a mossy knot. It is usually built on the upper side of a limb, but I have known of cases of its being built in a forked twig. The whole fabric is about an inch and a half in diameter, and about that in depth externally; it is hollowed about half an inch, and is three-fourths of an inch in diameter ; it is lined with a soft downy substance detached from flying seeds. The eggs are two in number, white, and nearly elliptical in shape, being of about equal size at both ends. Length of egg, about .45 in., breadth about .31 in. I am inclined to think, that in the latitude of New England, this bird raises only one brood in the season, but further South it undoubtedly rears two. The period of incubation is ten days.

On approaching the nest, the parent bird immediately flies at the intruder, and it was by this means that I have been enabled to find specimens of the nest, when I could not possibly have done so if their locality had not been betrayed by the bird herself. I have heard of young birds being taken from the nest when nearly fledged, kept for several weeks, and fed with nothing but sweetened water, but they always died after a short confinement, and I believe that it is impossible to keep this bird as a pet, from the fact that its actual food is insects, and it cannot live on any other, This little bird is extremely susceptible of cold, and if long deprived of the animating influence of the sunbeams, droops, and soon dies. A very beautiful male was brought me, which I put into a wire cage, and placed in a retired, shaded part of the room. After fluttering about for some time, the weather being uncommonly cool, it clung by the wires, and hung in a seemingly torpid state for a whole afternoon. No emotion whatever of the lungs could be perceived, on the closest inspection, though at other times, this is remarkably observable, the eyes were shut, and when touched by the finger, it gave no signs of life or motion. I carried it out to the open air, and placed it directly in the rays of the sun, in a sheltered situation. In a few seconds respiration became very apparent, the bird breathed faster and faster, opened its eyes, and began to look about with as much seeming vivacity as ever. After it had completely recovered, I restored it to liberty, and it flew off to the withered top of a pear-tree, where it sat for some time, dressing its disordered plumage, and then shot off like a meteor.—*Edward A. Samuels' Ornithology oj New England.*

INFLUENCE OF SOUNDS UPON ANIMALS.

The following notes upon this subject have appeared in the three numbers of the *Athenæum*, for October 26, November 2nd and 9th.—Having paid some attention to the physical sympathies of animals for peculiar sounds, I could not read, without interest, the article on "The reasoning power in Animals," which appeared in the *Athenæum* of the 5th of October. It was there mooted that hounds were given to baying when Sunday church bells rang, under the pleasing or displeasing assurance that there was no going a-hunting for them that morning. It may be asserted, with as conclusive proof from experience, that the canine race, especially when civilized by discipline, is capriciously sensative as to sounds, with or without ryhthm. I have again and again known a dog be excited to the most lugubrious howling by a singer or a violent player on an instrument, when quieter music has passed without such demonstration. Surely there can be nothing analogous to "the reasoning power" which makes Tray, Blanche, and Sweetheart express themselves in comment on the chime from the church tower in instances like these. The cause, I suspect, of such manifestations has to be sought elsewhere.

Y. L. Y.

In reading the review of Mr. Watson's "Reasoning Power in Animals," I too, was struck with the passage noticed by Y. L. Y., where the reviewer mentions the howlings of the dogs on hearing the church bells, because they indicated that there would be no sport on that day; but I set it down as a bit of pleasantry on the part of the reviewer, for I do not think that Mr. Watson, or the reviewer, or anybody else, could seriously attribute such an association of ideas to a dog. That musical sounds exercise a remarkable influence upon dogs I have myself seen instances. A house-dog formerly kept at a boys' school would howl in a most peculiar way whenever the school-bell was rung in his presence. As the bell never summoned him to lessons or to meals, to work or to play, he was perfectly innocent of sharing the emotions excited by its sound in the minds of the pupils. I could never satisfy myself whether his howling indicated pain or pleasure; more probably the latter; for if the sound of the bell had been distasteful to him, he would have barked at it; if it had excited alarm, he would have fled; but he invariably stood still, with his eyes fixed on the bell, and continued his lugubrious chant as long as it was rung; the moment it ceased, he silently betook himself to his usual canine occupations as if nothing had happened. Passing out of Oxford Street only a few days since, I observed a reedy barrel-organ sending forth its accustomed hoarse sounds, while at an open doorway on the opposite side of the street stood a dog, uttering the same peculiar continuous howl as noticed above; but the instant the organ ceased, the dog ceased also, and turned to follow the bent of its inclinations. Can this be a canine attempt at *singing?* A collection of carefully observed instances of the effects of sounds upon various animals would not be without interest.

F. L. S.

I have read with much interest the paragraphs which have appeared in the *Athenæum* on this subject, but cannot say I agree with "F. L. S." in thinking that the sound of music produces pleasure in a dog. I myself am musical, and given to much practising; and, moreover, possess two dogs, and am quite sure, that could "F. L. S." see their expression as I go towards the piano, he would not think pleasure stirred them. If the door be open, both dogs get up *at once*, and go straight out of the room; but should it be closed, they both howl with their noses in the air, sitting up at the same time and begging me to leave off; and so accustomed are they to the word "singing," that if I come into the room where one dog is asleep before the fire, and say in a low voice, "Punch, I am going to *sing*," the little creature *instantly* gets up and goes out of the room. Now, I can assure you this is a fact. I have also observed that in playing or singing a scale, the lower notes they do not so much object to, but the higher ones, and particularly certain notes, they howl at in such a way that to try and control them is perfectly useless. When I leave off, I am rewarded by long-continued dancing and springing about me by both dogs. I have often wished to know the cause of it, but no one has ever suggested a reason which satisfied me. My own idea is, that the sound produces an irritating effect on their nerves and brain, and that certain notes stun them.

J. H.

When I was a young man, my elder brother was a dog-fancier, and had a strong bull-terrier, which he sometimes contrived to have introduced to the house. When this happened before our family devotions began, the dog's presence was soon known by his joining in our psalmody; not as if it pained him, but from some impulse that he could not restrain. Some years ago, when part of the service connected with the sacrament in our country parishes was held in the church-yard, the collies belonging to many of the shepherds followed them, and afforded great sport to the youngsters, and gave great annoyance to the preacher and the beadle, by sending forth some inharmonious sounds from the outer circle.

G. T.

I beg the space of a few lines to express my concurrence in the opinions offered on this subject by "Y. L. Y." and "F. L. S." I have a dog of my own, which invariably utters loud cries—a mixture of whine and howl, dismally protracted—whenever he hears a street organ, or a piano in the house, play any solemn or mournful tune. By lighter airs he is not affected. He is only one out of many who distinguish themselves in the same manner. An accordion, I may add, always moves him. As this matter has nothing to do, as far as I see, with reasoning power, it is not touched upon in my book. The utterances appear to be quite instinctive; nor have I any notion, more than "F. L. S.," whether they are indicative of pain or pleasure; though, as "F. L. S." justly remarks, the probability seems to be in favour of pleasure, as the dog seems to join in the sound from natural inclination, and generally, I believe, manifests annoyance if he is checked in his performance. That the crisis may be canine attempts at singing is, I think, a very reasonable suggestion of "F. L. S."—The author of *The Reasoning Power*.

THE REINDEER.

The reindeer, or rane-deer, as some etymologists spell the word, is very widely distributed over the face of the globe. Its varieties are found from the coasts of Sweden and Lapland, through the north of Asia, to Kamschatka; and on the American Continent from the coasts of British Columbia to the north of Newfoundland; its occurrence depends, it would seem, very closely upon considerations of climate.

In earlier times it had apparently a still more extended habitat. Remains of the animal have been found by geologists at the north base of the Pyrenees, and in various parts of France. Immense numbers of its bones have been discovered in the south of France, where they appear to have served as food for the human denizens of the caves. In a cave in the Dordogne, a rudely shaped flint weapon was found in the vertebræ of a reindeer in a similar position. In the bone-caves of Glamorganshire many thousand antlers of the reindeer were discovered some few years since, and the remains of several distinct varieties have been dug up in the west of England, in the bed of the Thames, in Norfolk, in Forfarshire, and also in various parts of Ireland.

An idea at one time prevailed among naturalists that the reindeer existed in the south of Europe as late as the fourteenth century. This belief, which originated with Buffon, was founded on a passage in the printed copies of the works of Gaston de Foix, who, in his "Treatise of Hunting," speaks of the animal as found in Berne and Savoy. Cuvier, however, detected this to be an error, by collating the printed copies of the work in question with the original manuscript in the Imperial Library at Paris. The naturalist Pallas mentions the existence of these deer in the Ural Mountains at the end of the last century; and in the "Encyclopædia Britannica," (ed. 1857), it is stated that "Herds are still found among the pine forests which stretch from the banks of the Oufa under the 55th degree, to those of Kama. They proceed even further south along the woody summits of the prolongation of the Uralian Mountains which stretches between the Don and the Volga as far as 46 degrees." Thus the species approaches almost to the base of the Caucasian Chain, along the banks of the Kouma, where scarcely a winter passes without a few being shot by the Kalmucks.

The Lapland reindeer are found in a wild as well as in a domestic state, and the herds of the latter are sometimes recruited by young ones captured from the former.

When we consider this wide range, it appears strange that all successful efforts for the domestication of the reindeer should have been confined to so small a portion of the old Continent.

The reindeer average in height from nine to ten hands, the wild ones being the largest. Their colour is light, of various shades, and it becomes still lighter in winter. Both males and females of all the varieties of reindeer are provided with antlers, which vary greatly in form, and which are shed at a different period by each sex. During summer, they browse on every kind of green herbage and shrub which they can find; but in winter, their sole food appears to be the lichen known as the "reindeer moss," which they discover by instinct in the snow, digging for it with their tough and pliable muzzles and sharp-pointed fore-feet. It appears to be a well-ascertained fact that they will also eat the "lemming," or field-rat, with avidity.

The writer of a recent work on Lapland says that the reindeer "have nothing of the antlered monarch of the forest about them, but a careworn, nervous look, which" (he adds) "I do not wonder at, considering how they are bullied. There are creatures which sting them all over; and creatures which lay their eggs in their eyes and nostrils, and make themselves comfortable under their skin; and wolves, and gluttons, and dogs, and Laps; in short, barring a rat, I know of no animal that *is* so worried." He admits, however, that their constitutions do not appear to suffer under the treatment they receive, and that, like donkeys, they thrive under it.

It may amuse the reader to contrast with this account the description of a Lap encampment by the learned Von Buch, written at a time when *fine* writing was deemed most essential to a traveller's narrative. We have endeavoured in translating it to preserve the rather florid imagery.

"It is a new and pleasing spectacle to see in the evening the herd assemble round the encampment to be milked; on the hills around everything is in an instant full of life and motion. The busy dogs are everywhere barking and bringing the mass nearer and nearer, and the deer bound and stand still, and then bound again, with an indescribable variety of movements. When the animal, frightened by the dogs while feeding, raises his head and displays aloft his proud antlers, how beautiful and majestic is the sight! and when he courses over the ground, how fleet and light is his carriage! We never hear the foot on the earth; nothing but the incessant cracking of the knee joints, as if it proceeded from a repetition of electric shocks; a singular noise from the number of deer by whom it is at once produced; it is heard at a great distance. When all the herd, consisting of three or four hundred at least, reach the encampment, they stand still and repose or frisk about in confidence, play with their antlers against one another, or in groups browse round a patch of moss. Then the maidens run with their vessels from deer to deer; the brothers and servants throw a bark halter around the antlers of the animal they point out to him, and draw it towards them: the animal generally struggles, unwilling to follow the halter. The maiden laughs and enjoys the labour it occasions, and sometimes wantonly allows it to get loose so that it may be again caught for her, while her father and mother are heard chiding them for their frolic, which has often the effect of scaring the whole flock. On beholding this scene who does not think on Laban and Leah, on Rachel and Jacob? When the herd at last flocks round to the number of many hundreds, we imagine we are beholding a mighty encampment and the commanding mind which presides over the whole stationed in the midst."—*Once a Week*, November Part.

THE WALRUS.

A most distinguished visitor has arrived in London —a beast with whose general appearance most are familiar, by means of stuffed specimens or drawings, but which has been seen alive by few except arctic travellers. The 1st of November, 1867, will ever be memorable in the annals of Natural History as the day on which a living walrus (*Trichechus rosmarus*) arrived at the Regent's Park Zoological Gardens. As it was late in the evening when the van containing the animal arrived, it was determined by Mr. Bartlett to place the huge box in which the beast had travelled alongside the enclosure set apart for his accommodation, and to leave him undisturbed for the night. The next morning a portion of the wire-work of the enclosure was taken down, the box shifted close up to the aperture—a plank carefully removed, and out came the head of the Walrus. The poor beast snuffed and stared about, wondering where he was. We waited quite silent, and then out he came, further and further, till at last, finding the road clear, he waddled right out on to the open. The first thing he did was to put down his great nose and to sniff at the grass—he had, probably, never seen grass before—he then went straight up to a little tree, and examined it with the same sort of curiosity, with which we spectators were examining him. He then made direct to the pond, and pulled himself up on to the edge, first with his chin and then with his flippers. After looking round again, he ducked his head under water with the same kind of eagerness that a two months' absence from a bath would be likely to produce in a water-loving animal. Finding it all right, he slipped into the water with the noiseless glide of an otter; down he went, luxuriating in the bath for which he had pined for two months or more. After a long dive, up came his intelligent head to the surface once more, and he gave a long and anxious look round. At this moment we were much amused to observe the seals in the pond close by. These pretty little things had clambered to the edge of the stone parapet of their pond, and were gazing with all eyes, and with an expression of intense wonder, at the poor walrus, in whom, possibly they recognised an old acquaintance. Jemmy—for that is the name of the walrus—then came out of his pond and up to the railings, so that we had a good look at him. He is just about the same size as the sea bear. I tried to take his measurements, but the moment I put the tape near him he turned round and looked so terribly fierce, that I, of course, instantly desisted. He probably thought the tape was a rope, and knowing from experience that a rope was no friend of his, objected to its coming near him. His head is seal-like, but the eyes are not so large; they remind one much of the eyes of the hippopotamus. Their colour is dark brown, and the pupil exceedingly small. It is, as far as I could make out, not circular, but vertical, like that of a cat. I think that this peculiar structure is given to preserve the retina of the eye from the glare of the sun on the ice, and save the animal from "snow blindness." Again, it doubtless has to do with his being able to see during the semi-darkness of the long arctic winter; possibly it serves both purposes. The colour of Jemmy's coat is tawny, not unlike that of Scotch snuff; his hair is rather short, and throws off the water easily from its surface. When damp, it is apparently divided into diamond-shaped patterns, like a quilted petticoat. In his walk he wriggles much more than the sea bear. His hind flippers are connected together by loose skin; on land they appear awkward, but in the water they give him great facilities of swimming. When displeased he can roar famously. His voice is not at all unlike that of a lion, only, of course, not so loud. He is supposed to be about eight months old, and is certainly not so big as he will be. I make him out to be over seven feet in length. A full grown walrus will measure some sixteen feet long, ten feet girth, and have twenty inches to two feet of tusk, and a weight of over 3000lb. Jemmy's blunt muzzle is the most peculiar part about him. It is full and fleshy, like the "mouffle" of a North American elk. The whole of its anterior surface is covered with strong whalebone-like whiskers; the uppermost rows of these are quite short, the lower are much more developed, being from two to three inches in length. The points of all these whiskers are directed downwards, and somewhat towards the median line of the nose. They look stiff, like wires, but to the touch are soft, like the wetted bristles on a hair-brush. I have now some walrus bristles before me—they are not from Jemmy's nose—when wetted in warm water they become quite soft. Their colour is exactly that of a tortoiseshell comb, and they resemble the teeth of a comb in other ways. They are quite hollow—like a rabbit's tooth—one-third of their length. As in the lion and seal, so also in the walrus, these apparently rude organs of sensation are exceedingly sensitive. The conical cavity of the whisker is filled with nervous pulp; in fact, one might almost say that the whisker is simply a horn cap upon the top of an exceedingly large nerve. In the skull the foramen, through which these nose nerves send their main telegraph wires to the brain is exceedingly large, larger even than in the lion.—Frank Buckland, in *Land and Water*, Nov. 9.

PIGEONS AT SHERWOOD.

Of the family of the Columbidæ, three species are all that I can number, viz., the Ring Dove (C. palumbus), the Stock Dove (C. œnas), and the Turtle Dove (C. turtur).

Amongst our numerous woods and plantations the ring dove is plentifully distributed. It is an indiscriminate feeder on seeds of every kind; and, though well provided with abundance of beechmast and acorns, it levies heavy contributions on the crops of the farmer. In one way or other it is, however, pretty well kept in check, and is not seen in those enormously large flocks which are met with in some parts of the country.

Few of our native birds are shyer in their habits, or more difficult to approach within gunshot. I have often walked to a clump of trees where a pair have been roosting, but they would invariably take flight from the highest part of the trees and as far out of danger as possible, never giving me the possibility of even a long shot, and this I have found to be their general habit. Mr. St. John, in his last interesting work, remarks on the somewhat unusual tameness of these wild and wary birds, that they built in some shrubs close to his house and not above six feet from the ground, where, when sitting, they allowed the members of his family to pass without showing the least alarm. I have recently been told by a friend of a similar instance near his own house.

It would seem almost impossible for any bird to build a frailer nest than the wood pigeon, and I have often wondered that the eggs do not fall or are not blown off by the wind from the slight platform on which they are laid, and through which you may sometimes see them from below. I remember one instance in which a pair had selected a young birch tree as the site for their nursery, the stoutest bough of which was not more than an inch and a half in diameter; but it was on one very much smaller than this, and close to the stem, that this apology for a nest was placed. It was formed of very slender birch twigs; but they had been so sparingly used that it was simply a piece of lattice work, through which the two eggs were distinctly visible from the ground, the distance being about twelve or fourteen feet. One of these eggs was very much larger than the other—a peculiarity I have noticed on several other occasions.

In April, 1861, Mr. Sterling Howard communicated to the Sheffield Literary and Philosophical Society a most remarkable instance of the selection of materials for their nests by a number of domestic pigeons, and these were no other than horsenails! He said: "Over one end of the blacksmith's shop is a rude loft, in which are a number of boxes, the domiciles of the pigeons. The nails, which were abstracted from canvas bags and other receptacles, were of the ordinary kind for horseshoes, of various sizes, some new, others old and crooked. They were, however, laid with some regard to comfort, inasmuch as the points were not allowed to project upwards, but without any admixture of softer materials. This is the more singular as there was abundance of straw, shavings, &c., in the neighbourhood. On these 'iron beds' the birds had laid their eggs, which were just ready for hatching when the discovery was made of the use to which the nails were applied. The nails, when removed, filled a watering-can holding about two gallons, one of the nests containing more than fourteen pounds weight."

The stock dove (C. œnas) is not uncommon, mingling, in the winter more especially, with the small flocks of ring doves. I never found the nest on the ground, where it is stated to be frequently placed; but I knew a very large and almost globular mass of ivy in the fork of an ash tree, in Blythe-corner Woods in the close recesses of which a pair of stock dove, reared their young for several years together. I do not think this species is so numerous with us as the preceding one, but it is still plentiful.

The latter word cannot, however, be applied to the turtle dove (C. turtur), one or two specimens being all I have known in the district, though some have been killed in other parts of the country. I have never known it nest with us, and it can only be considered a rare straggler.—W. J. Sterland, in *Field*.

Orchard House Aviaries.

In addition to the growth of fruit and flowers these houses may be made a great source of gratification and amusement by being converted into what may be called orchard-house aviaries for small birds, a different arrangement of the interior only being requisite; the general elevation or shell of the structure being the same as in ordinary vineries. When an aviary is intended to be combined with a fruit, or flower house, we would erect a close wire trellis on each side the whole length of the house, about 4 feet from the side piers, and arched overhead. Outside of this wire inclosure or cage we would build a 9-inch wall, at about a foot from the piers to support the soil. The piers on which the house stands should be 3 feet high; this will allow a good elevation for the vine border. On the top of the interior walls the hot-water pipes would rest: a single pipe round the house will be sufficient. Against the interior walls we would train peach and nectarine trees to a trellis. The centre walk from the door should descend about a foot or so to the middle of the house, where we would have a shallow glass basin and a small fountain, at which the birds can drink and wash themselves. The vines should be planted outside, one under each sash, and trained inside with wires in the usual way. The interior of the cage should be planted with ornamental shrubs, so as to form thickets in which the birds would build. Flowering creepers should be trained to the wire trellis at intervals, all over the house; these would give, when in bloom, a very gay appearance. Openings in the wire trellis must be made under each ventilator to allow of dressing the vines and gathering the fruit.

It is scarcely necessary to give a list of birds to be kept in such a structure, as all lovers of them have their own especial favourites. Still, where a reference to a work on cage-birds is not at hand, a selection of a few pretty hard-billed species may be of service.

SELECTION OF SMALL HARD-BILLED BIRDS.

- Amandava, or Avadavat—an exceedingly pretty bird.
- Banded Finch.
- Blue Finch—a very beautiful bird.
- Brown cheeked Finch.
- Canary.
- Cape Finch.
- Chaffinch.
- Citril Finch.
- Common Quail.
- Goldfinch.
- Gowry Bird, or Nutmeg Bird.
- Indigo Bird—very beautiful plumage.
- Java Sparrow, or Rice Bird.
- Lesser Redpole.
- Linnet.
- Malacca Finch.
- Mountain Bunting.
- Purple Finch.
- Redbill—a very agreeable little bird.
- Siskin.
- The Bullfinch is a most interesting bird in an aviary, but it will disbud the trees in the winter, and thus prevent their fruitfulness when planted inside the cage.
- Virginian Nightingale, or Cardinal Grosbeak.
- Waxbill—a small and beautiful little bird.

Amongst the fruit trees which might be planted inside the wire inclosure may be mentioned standard apples, pears, plums, raspberries, and many other fruits, and in different portions of the aviary, patches of chickweed, groundsel, and other green food suitable for the health of the birds should be grown; these weeds would be entirely hidden by the judicious planting of ornamental shrubs. Camellias, Roses, Eugenia Ugni, Acacias, Azaleas, Fuchsias, Myrtles, Pomegranates, tender Rhododendrons, Clethra arborea, Eriobotrya japonica, and other ornamental shrubby plants might be grown in such a house.—*Hereman's Handbook of Vine and Fruit Tree Cultivation under Glass.*

Silk Worms from Natal.

At a recent meeting of the Literary and Philosophical Society, Mr. Latham read the following communication on silk producing worms from Natal:—In the "Natal Herald" of the 8th August last, there are copies of a correspondence between the Chamber of Commerce of this place, and some gentlemen at Natal, regarding certain silk producing worms, as they are termed, found near Graham's Town by Mr. Hiller, feeding on the leaves of the mimosa thorn or acacia. The result of the correspondence was, that some of the cocoons were presented to the Chamber here to have them reported on and their true value ascertained. They came into my hands, and the following remarks on them may be interesting to the Society.

From one of the cocoons the moth now exhibited emerged shortly after its arrival in England, and though much crippled, I have, through the kindness of Mr. Jansen, had it clearly identified with the insect

"Pachypasa effusa," of which there are several specimens in the British Museum collection from Natal. The moth laid about 50 eggs, of which I have mounted two or three, and they are here for examination. The eggs under the microscope exactly resemble in texture those of the ostrich, but each has a small black point, probably of a softer substance than the rest of the egg, and through which the caterpillar may emerge. From one of the cocoons I extracted the chrysalis also exhibited, and further the cast skin of the caterpillar rolled into a small ball as usual; by boiling this for some time in caustic potass, it became so softened that it was possible to get it to its original size, and to show its original form. You have it before you dried, and the series is therefore complete, egg, caterpillar, chrysalis, moth, and cocoon.

The original cocoon is, you will notice, a hard woody-like substance, but, by certain processes, Mr. Hiller states soaking in a solution of soda, the cement agglutinating the silk is dissolved and a soft silky looking bag remains. This consists of a thick outer covering, a loose middle lining, and a thinner internal lining, all of silk, which I hardly think could be wound but might possibly be carded.

As regards the commercial value of the article, an eminent silk broker writes as follows:—It is a carded cocoon, the waste silk is the outer covering of the cocoon and appears of tolerable fine fibre, but is bad in colour and not of a good merchantable appearance, if in quantity worth perhaps 1s. 6d. per lb. all round. Enquiries of a similar nature have been made from time to time by customers in the East, where silk does not form one of the staples of the country, and among other places, from Natal, but we do not find that any good can arise from efforts made to produce silk in any quantity; it is probably the most difficult of all known staples to establish in a new land.—*Mechanics' Mag.*, Nov. 2nd.

THE CHINA PEAR.

The Pear even in England is generally understood to be a tardy bearing tree, and the old couplet—

> He that plants pears,
> Plants for his heirs,

is an expression of this popular belief; nor is the character entirely undeserved, as with the exception of a few varieties, 10, 12, or even a greater number of years will often times elapse after the trees are planted ere they bear fruit. Such being the case even where it has been long acclimatised, people are naturally backward in planting it here, under new and untried conditions.

But my object just now is not to point out how we shall succeed with European and American varieties (experiments upon which are going on), but to endeavour to direct public attention to the China Pear.

This variety appears to have been in the neighbouring colony of New South Wales for many years. Being struck with the name, as probably denoting that it had been received from China, and knowing how thoroughly all fruits of Chinese origin appreciate our climate, I procured a tree, and as it was late in the season, temporarily planted it between two rows of Grape Vines, on the brow of a schistose slope devoted to Grapes. After remaining there two years it commenced to bear, and has borne regularly and freely ever since; requiring generally a little thinning of the crop, as it has a tendency to overbear.

It has had no doctoring and very little attention, except taking out the leading branch to open the interior of the tree, that it might bear on the inside as well as on the outside of the branches. It is grafted on the common Pear stock of the nurseries—has never been root-pruned nor lifted, and occupies a space of about 6 feet by 6 feet, or 4 square yards of ground. The wood is a dark grey, sprinkled with white dots, robust, long-jointed, of upright habit, and producing a profusion of fruit-spurs.

Unlike other Pears, cuttings readily root, especially if shaded and watered during a dry hot spring, and I feel convinced that it will play an important part both as stock and medium for grafting and double grafting other pears that are shy fruit-producers on the common stock. I have not yet proved its perfect adaptability to the Quince, but am experimenting with some of the best Flemish and French pears on the rooted China cuttings. The Marie Louise shows a stocky, sturdy robustness on this stock that is suggestive of a hopeful future.

This last season a severe thunderstorm most effectually thinned the fruit on the above mentioned tree, besides mutilating the branches to some extent; yet it ripened 50 large fruit, many of which weighed 16 or 17 ounces, a result which is not to be despised from 4 or 5 square yards of ground.

The fruit, when ripe, varies in shape, the breadth being sometimes as great as the length. It has a warm yellowish ground dotted all over with russet; a good-looking and very fragrant fruit. Its flesh is crisp, juicy, and sweet, the skin having something of a musky Pine-apple flavour; and as a cooking fruit, baked, stewed, or in pies, it is unsurpassed by any other Pear, its flesh when cooked having nothing like lumpiness or grittiness about it—in fact, leaving nothing to be desired. I have not said anything about its keeping qualities, as it has not been tested fully—the kitchen demand is so much greater than the supply. But I kept three or four in the summer of 1865-66 for six weeks on a shelf in an ordinary room, and the inference is that if they had been put away in a dry cellar, or some cool, dry, dark place, they would have been preserved much longer. *Fructus, in "Queenslander," Australian Paper.*

New Books.

Our limited space must of necessity compel us to give but very short notices of new books, but they will perhaps serve as a guide as to what books our readers may ask for at their libraries.]

The Nile Tributaries of Abyssinia, and the Sword Hunters of the Hamran Arabs. By Sir Samuel W. Baker, M.A., F.R.G.S., Gold Medalist of the Royal Geographical Society, &c. London: Macmillan and Co. 1867.

Those who take up this volume with the expectation of gathering from it information regarding Abyssinia will be disappointed. Of that country we learn nothing, with the exception of the frontier which is described in a visit paid to Mek Nimmur (The Leopard King), a notorious Brigand, who resided there. Nevertheless, this disappointment will not deprive the reader of any of the enjoyment he will feel on perusing the work. Although published since "The Albert Nyanza," it is really a narrative of Adventures in the Border Countries of Abyssinia, preparatory to the more important undertaking of exploring the Upper Nile.

Beginning with Atbara, accompanied by his brave wife, he visited all the rivers which come from the Highlands of Abyssinia to join the Blue Nile.

From the Atbara valley he journeyed first south, and then west, examining in succession the Settite, Royan, Salaam, Angrab, Rahad, and Dinder rivers, and finishing by a journey north-west along the banks of the Blue Nile from Abou Harraz to Khartoum, where the Blue and White Niles join.

The wonders of the country are well described. As a sample we may give the following extract, which describes the sudden rise of the Atbara, and its change from an almost dry river-bed with pools in the bends to a noble river :—

The cool night arrived, and at about half-past eight I was lying half asleep upon my bed by the margin of the river, when I fancied that I heard a rumbling like distant thunder : I had not heard such a sound for months, but a low uninterrupted roll appeared to increase in volume, although far distant. Hardly had I raised my head to listen more attentively when a confusion of voices arose from the Arabs' camp, with a sound of many feet, and in a few minutes they rushed into my camp, shouting to my men in the darkness, "El Bahr ! El Bahr !" (the river ! the river !)

We were up in an instant, and my interpreter, Mahomet, in a state of intense confusion, explained that the river was coming down, and that the supposed distant thunder was the roar of approaching water.

Many of the people were asleep on the clean sand on the river's bed; these were quickly awakened by the Arabs, who rushed down the steep bank to save the skulls of my two hippopotami that were exposed to dry. Hardly had they descended, when the sound of the river in the darkness beneath, told us that the water had arrived, and the men, dripping with wet, had just sufficient time to drag their heavy burdens up the bank.

All was darkness and confusion; everybody was talking and no one listening; but the great event had occurred, the river had arrived "like a thief in the night." On the morning of the 24th June, I stood on the banks of the noble Atbara river, at the break of day. The wonder of the desert ! yesterday there was a barren sheet of glaring sand, with a fringe of withered bush and trees upon its borders, that cut the yellow expanse of desert. For days we had journeyed along the exhausted bed : all Nature, even in Nature's poverty, was most poor ; no bush could boast a leaf ; no tree could throw a shade ; crisp gums crackled upon the stems of the mimosas, the sap dried upon the burst bark, sprung with the withering heat of the simoom. In one night there was a mysterious change —wonders of the mighty Nile !—an army of water was hastening to the wasted river ; there was no drop of rain, no thunder-cloud on the horizon to give hope, all had been dry and sultry ; dust and desolation yesterday, to-day a magnificent stream, some 500 yards in width, and from fifteen to twenty feet in depth, flowed through the dreary desert ! Bamboos and reeds, with trash of all kinds, were hurried along the muddy waters. Where were all the crowded inhabitants of the pool ? The prison doors were broken, the prisoners were released, and rejoiced in the mighty stream of the Atbara.

The 24th June, 1861, was a memorable day. Although this was actually the beginning of my work, I felt that by the experience of this night I had obtained a clue to one portion of the Nile mystery, and that, as "coming events cast their shadows before them," this sudden creation of a river was but the shadow of the great cause.

The rains were pouring in Abyssinia ! these were the sources of the Nile !

Of the Sword Hunters of the Hamran Arabs, which gives the second title to the work, and are only to be found described in this Expedition, we have the following account.

I had an audience of a party of hunters whom I had long wished to meet. Before my arrival at Sofi I had heard of a particular tribe of Arabs that inhabited the country south of Cassala, between that town and the Basé country: these were the Hamrans, who were described as the most extraordinary Nimrods, who hunted and killed all wild animals, from the antelope to the elephant, with no other weapon than the sword ; the lion and the rhinoceros fell alike before the invincible sabres of these mighty hunters, to whom, as an old elephant-hunter, I wished to make my salaam, and humbly confess my inferiority. From the manner in which their exploits had been hitherto explained to me, I could not understand how it could be possible to kill an elephant with the sword, unless the animal should be mobbed by a crowd of men and hacked to death ; but I was assured that the most savage elephant had no chance upon good riding-ground against four aggageers, as the hunters with the sword are designated.

The following is a description of their method of Hunting :—

Their method was to follow the tracks of an elephant, so as to arrive at their game between the hours of 10 a.m. and noon, at which time the animal is either asleep, or extremely listless, and easy to approach. Should they discover the animal asleep, one of the hunters would creep stealthily towards the head, and with one blow sever the trunk while stretched upon the ground : in which case the elephant would start upon his feet, while the hunters escaped in the confusion of the moment. The trunk severed would cause a hæmorrhage sufficient to insure the death of the elephant within about an hour. On the other hand, should the animal be awake upon their arrival, it would be impossible to approach the trunk : in such a case, they would creep up from behind, and give a tremendous cut at the back sinew of the hind leg, about a foot above the heel. Such a blow would disable the elephant at once, and would render comparatively easy a second cut to the remaining leg ; the arteries being divided, the animal would quickly bleed to death. These were the methods adopted by poor hunters, until, by the sale of ivory, they could purchase horses for the higher branch of the art. Provided with horses the party of hunters should not exceed four. They start before daybreak, and ride slowly throughout the country in search of elephants, generally keeping along the course of a river until they come upon the tracks where a herd or a single elephant may have drunk during the night. When once upon the tracks, they follow fast towards the retreating game. The elephants may be twenty miles distant ; but it matters little to the aggageers. At length they discover them, and the hunt begins. The first step is to single out the bull with the largest tusks ; this is the commencement of the fight. After a short hunt, the elephant turns upon his pursuers, who scatter and fly from his headlong charge until he gives up the pursuit ; he at length turns to bay when again pressed by the hunters. It is the duty of one man in particular to ride up close to the head of the elephant, and thus to absorb its attention upon himself. This insures a desperate charge. The greatest coolness and dexterity are then required by the hunter, who now, the *hunted*, must so adapt the speed of his horse to the pace of the elephant, that the enraged beast gains in the race until it almost reaches the tail of the horse. In this manner the race continues. In the mean time two hunters gallop up behind the elephant, unseen by the animal, whose attention is completely directed to the horse almost within his grasp. With extreme agility, when close to the heels of the elephant, one of the hunters, while at full speed, springs to the ground with his drawn sword, as his companion seizes the bridle, and with one dexterous two-handed blow he severs the back sinew. He immediately jumps out of the way and remounts his horse ; but if the blow is successful, the elephant becomes disabled by the first pressure of its foot upon the ground ; the enormous weight of the animal dislocates the joint, and it is rendered helpless. The hunter who has hitherto led the elephant immediately turns, and riding to within a few feet of the trunk, he induces the animal to attempt another charge. This, clumsily made, affords an easy opportunity for the aggageers behind to slash the sinew of the remaining leg, and the immense brute is reduced to a stand-still ; it dies of loss of blood in a short time, *thus positively killed by one man with two strokes of the sword.*

There are two maps accompanying the book. The reader will find many useful hints to intending travellers in wild countries. The illustrations might be better, but they do not detract from the reader's enjoyment.

A Handbook of Vine and Fruit Tree Cultivation under Glass. By Samuel Hereman. Published by Hereman and Morton.

We have received this new edition of a good book, and can recommend it to all who are interested in cultivating under glass. Many items of importance have been added, and it is now a very complete and useful treatise. The first chapter treats of Orchard-houses, and will be found interesting ; the second gives the arrangement of Sir Joseph Paxton's Hot-houses, and various Ornamental Conservatories ; chapter 3, Hints and directions for Heating ; chapter 4, Directions for the Cultivation of various Fruits ; chapter 5, on Orchard and Winter Gardening, and lastly, chapter 6, on Orchard House Aviaries.

AMERICAN, FRENCH, AND GERMAN WORKS.

Influence of Climate in North and South America ; showing the Varied Climatic Influences operating in the Equatorial, Tropical, Sub-tropical, Temperate, Cold, and Frigid Regions. Accompanied by an Agricultural and Isothermal Map of North America. Compiled by J. Disturnell, Author of "Influences of Climate relating to the World, &c." New York : D. Van Nostrand. London : Sampson Low, Son, and Marston.

This volume treats only of America, but it contains a tolerably perfect account of American climates from the Arctic sea to Cape Horn. It is interesting and curious to observe how widely the climate of different places in the same latitude varies, as between the Atlantic and the Pacific coasts, the inland and the seaboard, the neighbourhood of the Lakes and the waterless interior of the West. The extremes of American weather are also very noticeable, the thermometer frequently ranging from 125 or 130 degrees in the Northern States, varying from a summer heat of 100 degrees to a winter cold of 30 degrees below zero. It would seem that such a climate must needs be unhealthy, yet the death-rate of the States is far lower than that of England ; and that of Canada, with a summer that allows peaches and grapes to ripen in the open air, and a winter almost Arctic in its severity, is one of the healthiest in the world. Not the least valuable portions of Mr. Disturnell's work refer to the soils and products of different parts of the Continent, their actual crops and their potential capabilities.

Geological Survey of Illinois. Vol. I. Geology. Vol. II. Palæontology. A. H. Worthen, Director. Published by Authority of the Legislature of Illinois. London : Trübner. 1867.

We have here before us, in two ponderous volumes, the results of an investigation ordered by the Legislature of Illinois into the geology of that State. The investigation has been most searching and complete, and the work contains a clear and extensive account of the geology of the State at large, and of its mineral wealth.

Rapport sur les Progrès de l'Anthropologie. Par A. de Quatrefages. Paris and London: L. Hachette and Co.

Among the many interesting reports published by the French Government this new volume of M. de Quatrefages will occupy a distinguished place. It is the history of almost a new science. The author begins by defining the province of anthropology, and marking its frontiers. The immense number of data which fall under the head of anthropology accounts for the fact that this science is the newest of all. It was impossible, for instance, to lay down any general conclusion as to the nature and constitution of the human race before the geography of the globe had been thoroughly studied. Yet it is only within a comparatively recent period that both hemispheres have revealed their secrets to travellers, and even now we are very far from having an accurate knowledge of the whole surface of the earth. The first chapter in the book before us reviews the various phases through which anthropological science has passed from the days of Buffon to the Foundation of the Paris Société Ethnologique in 1839. This period comprises only a little more than sixty years, and yet it includes the names of some of the most eminent scientific men—Cuvier, the Schlegels, Blumenbach, &c. The progress of anthropology during the last seventy years forms the subject of the second chapter, which gives us, besides, an interesting and very complete account of the books, periodicals, collections, societies, methods of teaching, and other details bearing upon the science. These two chapters constitute a kind of historical summary or introduction; the book itself is divided into three sections, treating respectively of general questions, the common characteristics of the human race, mixed races and crossings. An appendix gives us the scheme proposed by M. de Quatrefages for the classification of the different branches of the great family of mankind. His style is remarkably simple, and his method is so clear that the book will be interesting even to readers who are comparatively ignorant of natural history.

Les Navigations Françaises et la Révolution Maritime du 14ᵉ au 16ᵉ Siècle, d'après les Documents inédits tirés de France, d'Angleterre, d'Espagne et d'Italie, par Pierre Margry. (Paris, Tross.)

This work is devoted to accounts of various voyages of discovery undertaken by French navigators, compiled for the most part from documents hitherto inedited. M. Margry has been long engaged in searching for documents, which he had reason to believe were in existence, recording the early voyages of Frenchmen, and he has been so successful in his search that if we admit the authenticity of the MSS. now published, it must be conceded that France has stronger claims to the merit of geographical discovery than is generally supposed. The greater portion of the volume is taken up with the voyages of adventurous seamen desirous of reaching India by a shorter route than that round the dreaded Cape of Storms.

Rapport sur les Progres de l'Astronomie. Par M. Delaunay. Paris and London: L. Hachette and Co.

M. Delaunay's account of astronomical science presents a very complete and accurate description of astronomical discovery. He gives a short survey of the explorations made by astronomers in the planetary system; he then goes on to examine M. Foucault's ingenious method for proving the movement of the earth round the sun, and afterwards describes the most recent charts drawn of the heavens at various latitudes, and, after devoting a few paragraphs to comets and shooting stars, concludes with an explanation of the newest instruments employed by scientific men in their observations.

Beiträge zur Ethnographie and Sprachenkunde Amerika's zumal Braziliens. Von Dr. C. P. F. von Martius. 2 Bde. Leipsic: Fleischer. London: Asher and Co.

Dr. Von Martius has for many years enjoyed celebrity as a traveller in Brazil. This country has never lost its attractions for him, and we are now presented with the results of continual study in two stately octaves, partly compiled from a legion of publications, but largely supplemented by the personal knowledge of the author. The first volume is devoted to ethnology, describing and classifying the various obscure tribes of the Brazilian wilderness as accurately as possible, and also giving an account of their customs, and of the rude traces of civil society among them. The second is philological, and is chiefly a string of vocabularies, bristling with polysyllables of the most formidable appearance. The work is a valuable contribution to an intricate though by no means inviting subject.

Siluria: a History of the Oldest Rocks in the British Isles and Other Countries; with a Sketch of the Origin and Distribution of Native Gold, the General Succession of Geological Formations and Changes of the Earth's Surface. By Sir Roderick I. Murchison, F.R.S., Director-General of the Geological Survey of the British Isles. New edition, price 30s. London: John Murray, Albemarle Street, W.

Meetings of Learned Societies.

ASTRONOMICAL SOCIETY.

A meeting of this society took place on November 8th, the Rev. C. Pritchard, M.A., President, in the chair.—Captain T. Almond, Messrs. S. Courtauld and E. Story were elected Fellows.—The following papers were read:—"Eclipses and Transits of Jupiter's Satellites and Eclipse of the Moon," by Mr. Weston.—"Jupiter without his Satellites," by Mr. Prince.—"Appearance of Jupiter, August 20," by Mr. Hough.—"On the Solar Eclipse, August, 1868," by Mr. Stoney.—"On Jupiter without Satellites exterior to his Disc," by Mr. Burr.—"Annual Parallax of Sirius," by Mr. C. Abbé.—"The Lunar Crater Linné," "Occultations of Stars by the Moon," and "On Lunar Eclipse, September 17, 1867," by Capt. Noble.—"Jupiter without a visible Satellite," and "Account of an Observing Chair," by the Rev. W. R. Dawes.—"The November Meteors of 1867," by the Rev. A. W. Deey.—"On the Newton-Pascal Controversy," by Professor Grant; and "Longitude of Kingston Observatory," by Mr. Kington.

ANTHROPOLOGICAL SOCIETY.

The first meeting of the session was held on Tuesday, November 5th, Dr. Leeman, vice-president, in the chair. Dr. J. Hunt read a report of the last meeting. Mr. Fred Collingwood, the secretary, next read an account of the society's proceedings at Dundee. Mr. John Collinson, F.A.S.L., then read a paper "On the Mosquito Indians," among whom he had resided some years. They consisted of seven distinct tribes, to some of whom the Moravian missionaries had done great good. He said that some of the tribes practised flattening the heads of their children in a manner similar to the Indians of Peru and Columbia. They believe in good and evil spirits, but prefer to supplicate the evil rather than the good. He had compiled a vocabulary of a thousand words of the Wolwa language, and his was the only one which had been formed. The chairman, Dr. Leeman, in speaking of the character of the tribes of the Mosquito shore, said there was a great decline in the civilisation of Central America. He said that there had been a recent discovery of important sculptures in the Mosquito territory. Captain Bedford Pim, R.N., denied the beneficial effects of missionary labours amongst the tribes; and adverting to an account of a disgustingly intoxicating liquor which the native women made for the men of chewed bananas and saliva, he said something similar was used in the Sandwich Islands. Mr. Collinson, in replying to the remarks of the members, said he considered that the pure Indians were superior in moral character to the half-breeds. The king must be a man of pure aboriginal descent. Dr. Charnock, V.P. of the society, objected to the term Indian, as applied to any but an inhabitant of the banks of the Indus, wishing the society to reverse the usages of centuries which originated, however, in the mistake of Columbus, who thought he had reached Hindostan. The society adjourned till Tuesday, November 19th.

BRISTOL NATURALISTS' SOCIETY.

The second meeting of the session took place on October 3rd, Mr. T. Pease, vice-president, in the chair. Mr. F. Fedden read a paper entitled "Observations on the Natural History of Burmah," which described the geographical position of the country, its ruins and minerals, curious mud volcanoes, and also the human inhabitants, amongst whom he had resided seven years. October 10, in the Zoological Section, Mr. Swayne read for Mr. C. O. Groom-Napier, F.G.S., a paper on "The Dodo," which was illustrated with coloured drawings, a set of bones from Mauritius, and Professor Owen's diagram of the skeleton.

GEOLOGICAL SOCIETY.

At the above society, on Wednesday evening, November 6th, W. W. Smyth, Esq., M.A., president, in the chair,—N. Plant, Col. Fox, G. H. F. Ulrich, the Rev. J. J. Bleasdale, D.D., J. Ince, and the Rev. T. S. Wollaston, M.A., were elected Fellows. A paper was read by Mr. Tylor "On the Amiens Gravel and the River Somme." Mr. Tylor came before the society with views entirely differing from those already held. It was his object to prove that the action of the river was the cause of the altered appearance of the formation in the valley, and that the organic remains and flint instruments found at Abbeville and other places were brought down and deposited in their present position by this cause; he instanced the action of the River Lea at the Clapton-terraces as having produced similar results. A careful examination of gravels taken from the highest levels with those of the lower proved that the shells, etc., were common to all. Of the chalk formation itsel some curious conditions were pointed out; in some places fissures were filled in with lias, and in others the very uneven upper surface in places descended in pipes to various depths, and in diameter some of them reached ten feet, containing detritus and flints of various irregular forms; in this *debris* their perfect form and uninjured condition prove that they were deposited in still or slowly moving water. Mr. Prestwich defended his position with his usual ability. He holds that there are two gravels of an older and newer formation lying one over the other. In the older gravel he notices human remains in various forms, and in this rests the differences between the two observers. Sir Charles Lyell went at some length into the inquiry respecting the action of rivers, and pointed out the hundreds of centuries of time requisite to prepare the pebbly gravel composing the debris washed down, and described the condition of river banks after heavy and repeated floods, and the deposition of brick clay, and land and fluviatile shells along the banks; he would have preferred the levels being taken from the river, rather than from the sea, as being more easy for comparison. Sir John Lubbock, Mr. Evans, and several other speakers took part in the discussion. Sixteen new members were elected to the society.

GEOLOGISTS' ASSOCIATION, UNIVERSITY COLLEGE, LONDON.

The session commenced on Friday, November 1st, with a paper by the Rev. Thomas Wiltshire, M.A., F.G.S., "On the Chief Groups of the Cephalopoda." The author having given a definition of the forms of life to which the term cephalopoda is restricted, proceeded to divide the class into the two great orders of the *Dibranchiata* and the *Tetrabranchiata*: the common cuttle-fish and the pearly nautilus being taken as types of these orders, various facts in connection with their organisation and habits were mentioned, and allusion was made to some of the other genera now existing in the present seas. These remarks served as an introduction to the description of the fossils belonging to the same class. The belemnites, the ammonites, and the nautili, with their sub-genera, were explained. The old traditions relative to the two former were not forgotten, and the knowledge of more modern times brought to bear upon the subject. The paper closed with some remarks upon the existence of the nautili group in the more ancient deposits, and upon the importance to be attached to the zones of all these fossils in connection with agricultural and mining operations.

GEOGRAPHICAL SOCIETY.

At the meeting held on November 11th, Sir R. I. Murchison, president, in the chair, the Rev. A. A. W. Drew, M.A., W. H. Evans, Sir H. Bartle Frere, and the Rev. J. Graves were elected Fellows.—The President, in opening the session, gave a *résumé* of geographical progress since the last meeting. The latest news received from the Livingstone Search Expedition was dated the 27th July, on which day Commander Gordon, of H.M.S. Petrel, reported that the search party, had safely entered the Kongoni mouth of the Zambesi; and having luckily obtained on the spot a negro crew for the steel boat, he had departed at once up stream, before the cruiser's boats recrossed the bar in the evening. No further news was expected till February or March in the coming year. Alluding to Abyssinian geography, he announced that Mr. Markham, the senior secretary of the society, had been appointed geographer to the expedition now on foot, and had departed for that country ten days previously. The other men of science accompanying the expedition had been appointed in Bombay. The geologist was Mr. W. Blandford, the Deputy Superintendent of the Geological Survey of India—as sound and clear-sighted a practical geologist as could have been found at home. The map of Abyssinia recently issued by the Topographical Department of the War Office, and compiled by Colonel Cooke, R.E., was mentioned as the result of a an assiduous sifting and comparison of all previous documents, combined with hitherto unpublished materials. A recent detailed map of the northern parts of Abyssinia had also just been published by Dr. Petermann; and a work had recently appeared from the pen of the learned German traveller, Theod. von Heuglin, containing the narrative of his extensive journeys and researches in Abyssinia in 1861-2. Important papers were expected to be read in the course of the session on different portions of the central American Isthmus, among them one by Mr. Collinson, C.E., on "Nicaragua," and another on "Darien," by M. Lucien de Puydt. An account of his recent explorations in Greenland was also expected from the pen of Mr. Edward Whymper, who had just arrived in England from his arduous journey. Mr. C. R. Markham sent in a paper "On the Portuguese Expedition in the Sixteenth and Seventeenth Centuries," which was read. John II., of Portugal, sent two travellers into the East. One of these men, arriving at the court of King Alexander (Prester John), was detained in Abyssinia during the rest of his life; the other, having penetrated as far as Malabar, returned, and visited Abyssinia. The then king of the country, being in difficulties with his neighbours the Moors, sent letters to Portugal and to Rome asking for help. Portugal sent men and money, and during the short term of their occupancy—from 1526 to 1633, when the Jesuits were expelled—many fortified places were erected. The routes of the Portuguese expeditions were pointed out, and at the conclusion of the paper Sir H. Rawlinson gave a geographical description of the country, aided by a most carefully arranged may by Captain George, R.G.S. Dr. Beke stated that the climate was most salubrious, and pointed out the fact that none of the prisoners were ill or had died. Lord Houghton hoped Government had taken the precaution of consulting former travellers, and Sir R. Murchison stated that such had been the earnest desire of the Foreign Minister, and that no means had been neglected by which information could be obtained. Mr. H. Seymour, M.P., stated that the subject introduced by Lord Houghton had already been fully discussed in Parliament last session, and he had no doubt that the chiefs of the expedition would know how to act when once they had entered upon the campaign. The assemblage was larger than usual, and thirty-six new fellows were elected.

ETHNOLOGICAL SOCIETY.

At this meeting Mr. Crawfurd read Mr. Consul Plowden's notes on Abyssinia and its races, and followed it with a commentary by himself. For the many years this clever traveller dwelt in the country he appeared to enjoy the confidence of the present king, and by his great skill and judgment he succeeded in raising Theodore from a condition little better than that of the rest of his ignorant and sensual fellow-countrymen to a really respectable and praiseworthy monarch. On the death of Plowden the king relapsed into his semi-barbarous condition. In a country so rich in the productions of temperate regions, and where the people are given to none of the vices of their African neighbours, life is most agreeable. Their scrupulous regard to ceremonial in private life, their feasting at the houses of the great and observance of superstitious observances, makes them closely resemble the society of Europe in the middle ages. Their colour is black and nut brown. The Gallas are, according to Dr. Beke (who was present at the meeting) an intruding race, having entered Abyssinia, as the Normans came into England. Building is an art unknown; therefore, there are no antiquities. Mr. Crawfurd stated that with the exception of a few works in the Amharic character they are destitute of literature; but Sir H. Rawlinson, who spoke on the literature as a good ethnological test of the antiquity of races, proceeded at some length into the curious history of the Amharic language and its records. At Axum is an obelisk, and at the sea coast a chair bearing an inscription recorded by the famous Cosmos in the fifth century; and from these early records was traced a language similar, if not identical with that on the inscribed rock in South Arabia, on the opposite coast. These inscriptions were identical in many respects with old inscribed cylinders found in Babylonia, giving dates certainly one, two, and three thousand years B.C. Amongst the guests of the evening were Lady Franklin, Captain Sherard Osborne, and others. A series of photographs of the Nicobar pirates (to whom a melancholy interest attaches just now), taken by Captain Beddingfield, was exhibited.

ENTOMOLOGICAL SOCIETY.

At a meeting on November 4th, Professor Westwood, V.P., in the chair, Mr. Bond exhibited three recent additions to the list of British Lepidoptera, *Psyche crassiorella* of Bruand, *Grapholitha ravulana* of Herrich-Schäffer, and *Coccyx vernana* of Knaggs. Mr. T. W. Wood exhibited variously coloured pupæ of *Papilio Machaon*, *Pieris brassicæ*, and *P. rapæ*, and read some remarks on the colouration of Chrysalides, with a view to show that their hue was more or less derived from the objects in their immediate vicinity at the time of changing from the larva state. Mr. M'Lachlan exhibited a remarkable species of Mantispidæ from Bahia, which he considered to be the female of the *Trichoscelia notha* of Erichson; also two gynandromorphous insects belonging to Mr. B. Cooke, of Manchester, one a saw-fly, *Dolerus madidus* of Klug, and the other a Trichopterous insect, *Limnephilus striola* of Kolenati; also two monstrosities received from Professor Zeller, a *Hylotoma fasciata*, in which the left posterior tibia was two-jointed, and a *Tenthredo scutellata* with five wings. The following papers were read:—"Descriptions of some new Species of "Diurual Lepidoptera," by Mr. W. C. Hewitson; "A Monograph of the Genus Thais," by the Rev. D. C. Timins; and "A Revision of the Australian Buprestidæ described by the Rev. F. W. Hope," by Mr. E. Saunders.

ROYAL HORTICULTURAL SOCIETY.

At the general meeting held November 5th, Major Trevor Clarke in the chair, five new Fellows were elected and one society affiliated. The Chairman directed attention to a Pelargonium, the result of a cross between one of the quercifolium section called white unique, which was first brought into notice by Mr. Beaton, and Rollisson's unique, as showing how great an improvement may be effected even by a first cross. Major Clarke added that he wished to bring the rough-leaved quercifolium varieties into notice, as they might be much improved. One of their good qualities was their remarkable fitness for button-hole decoration. Mr. Murray directed attention to a piece of a lime tree which had been brought by Mr. Reeves, interesting from the marks which it exhibited, and with which the greater portion of the tree it was taken from was covered. They appeared, however, to be merely the slimy marks of snails. Mr. Reeves having stated that two-thirds of the tree was in a similar condition, Major Clarke said he agreed with Mr. Murray as to the cause, and urged members to bring to the society's meetings anything that appeared to be abnormal, as such specimens frequently proved of much interest in a scientific point of view.

QUEKETT MICROSCOPICAL CLUB.

A monthly meeting of this club was held at University College on the evening of October 25, the President in the chair. Mr. S. J. McIntyre read a paper on "Chelifers," in which he gave some interesting facts with regard to the haunts, habits, and mode of capture of these curious animals, resembling minute scorpions, and having the backward and sideway motions of crabs. Of the fifty-four known species eight are British, and are chiefly found under the bark of trees and in houses, amongst old papers, &c., often rendering good service by feeding on the insects which are usually so destructive in old libraries. Several living specimens were exhibited under the microscopes, where their activity in the pursuit of their prey was conspicuous. A paper by Mr. C. Nicholson, M.A., on "Object Glasses for the Microscope," was read. Nine members were elected.

Correspondence.

[*Under this head we shall be glad to insert any letters of general interest.*]

MIGRATION OF BIRDS AND INSECTS.

SIR,—I do not at all agree with the theory of Mr. Hunt and Harvie (mentioned in the late numbers of the NATURALIST'S NOTE BOOK), in thinking that the migration of birds is caused by the migration of the insects on which they feed. Late in Autumn, after the birds have left for their winter quarters, I have observed on fine days, when the sun shines and warms the surface of the ground, that winged insects come forth and fill the air; this confirms the opinions of Mr. R. W. B., and Mr. Ulidia.

Again, if as Mr. Hunt thinks, birds follow "great hords of insects," they must surely fly at a very slow rate to keep up with the insects, whose powers of flight are well known to be very much less than that of birds.

Again (as stated by Mr. Ulidia) it is very strong on our side, that almost yearly great numbers of migratory birds fall dead from sheer starvation, on the decks of ships bound for distant lands. It is a well-known fact, that a very great proportion of our flying insects are killed by the severe frost of winter. In conclusion, I may add, that I quite agree with "R. W. B." that birds are induced to leave this country by the coldness of the weather, and to return, from their love to the place of their birth,

I am, yours truly,
J. D. S. W.

Mavisbush House, Nov. 9th.

SIR,—I am glad to see more remarks on the migrations of the swallow (*hirundo rustica*) in your valuable columns, it is a subject of great interest to all. Your correspondent "Mr. A. G. Harvie," states in the November number, page 315, we have proof that they (swallows) do not hybernate. Would he (with your permission) insert a few of the most striking proofs in the NOTE BOOK?

Many people laugh at the idea of swallows hybernating, but well authenticated facts have shown that it is not an impossibility: the great White, of Selbourne believed it, so I think the case deserves investigating. Swallows have often been found in a torpid state in winter, but very seldom seen taking their flight across the ocean. How is it that swallows disappear for a week or more, and then return if the weather changes? Do they come back again from the other side of the ocean, or how is it? Hoping I have not trespassed on your pages,

I remain, yours obediently,
T. R. CLEPHAN.

Stockton-on-Tees.

Short Notes.

THE GUINEA FOWL.—The Pintado, or Guinea fowl, is partially known in a domestic state all over Europe, but is most common on the Mediterranean coasts. Africa appears to be its native country, and it was probably introduced into this country from Guinea. It is not only quite hardy, but we find this fowl very profitable to rear, and consider if the mode of rearing it were better known it would be more kept than it is. The first week in June is soon enough to begin sitting common fowls on Guinea fowls' eggs. They come off in July, when plenty of ant eggs can be found for their food. One of our Guinea hens laid 180 eggs from April to October in 1851. Of course we feed them well. We never allow them to sit on their own eggs, but prefer giving them to a turkey, which will bring them up as cautiously as any hen, in fact better. We would recommend turkeys who lose their first brood to be set on the Guinea fowls' eggs to rear them. A turkey can sit on from 20 to 24 eggs, whilst a common hen only upon 15 eggs. They do not like confinement, and if near a good park or grass fields where they can range, will find more than half the food they require. The best way we find to render them tame is to feed them in one particular place, and at one specific time of the day, when they will not fail to come to the accustomed spot. They are fond of roosting in trees, if you are not particular in getting them home to roost early in the evening; but as we are careful of ours in this respect, we can drive them home at an early hour as easily as a flock of sheep. They cannot be put up to fatten, but must be allowed a good range, with plenty of food. We can generally sell them in February for 5s. a couple, and they are as easy to keep as chickens. To rear Guinea fowls, however, a good sitting hen or turkey takes 28 to 29 days to hatch, and as soon as they are hatched they will run about and be very wild, like a partridge. We place the hen and brood under a coop, with a lift similar to that used by keepers in rearing young pheasants, and are careful that there are no apertures through which they can get out, for in that case they would get to a stack of wood, or something of that sort, from which it would be very awkward to get them out again before they starved. Therefore we keep them very close within this coop for ten days, and give them plenty of ant eggs in the left compartment of the coop, and if we can procure sufficient they will require no other food; indeed they will not do well without them. Any one who can rear pheasants or partridges may rear Guinea fowls, as they seem to require the same treatment at first.—Land Steward, in *Gardener's Chronicle*, Oct. 26.

INJURY TO COFFEE PLANTATIONS.—"How many of your readers, I wonder," says the Madras correspondent of the *Times*, October 22nd, "have heard of the 'borer.' I never myself remember to have seen its name in any English newspaper. But here, in Madras, it has long filled the columns of our press, and lorded it over our dinner tables, until just now it had to give place to the Abyssinian expedition. It is a kind of small grub which infests coffee plantations, and which in the coffee districts of this Presidency has done, and is doing, mischief incalculable. A planter told me yesterday that on one of his estates, 320 acres, or about 400,000 trees, had in one season been entirely and irretrievably destroyed by it. He estimated the yearly produce of these trees at £10,000, and considered that of this about half was net profit. The destruction was so sudden as to be inevitable. He had no intimation whatever of danger until he saw the leaves turn yellow and droop, and the trees were then past all hope. This may have been an exceptionally bad case (I mean as regards the extent of the calamity, not as regards the nature, which is almost invariably the same), but there are many more very like. Here and there planters have been positively ruined, and obliged to give up their estates, and leave their homes. There is a report that the Madras Government think of appointing a special commissioner to investigate the subject, and it is, without doubt, well worthy of Governmental notice, for though many doughty champions have entered the list against him, and many schemes have been confidently recommended for his overthrow, the borer does not yet seem to have found his match."

AUTUMN LEAVES.—Wishing to produce something out of the common way in table decoration, the other day the idea occurred to me of using "dead leaves" in lieu of flowers, and the result was so successful that I am induced to give you a short description of the arrangement. The flat part of a Dobson's Dinner Vase was filled with moistened sand, and round the glass stem was twined a slender branch of Lonicera aureo-reticulata, whose pretty green and yellow leaves droop downwards. The outer edge was formed of a fringe of hardy Ferns; next to them a few leaves of Mrs. Pollock, Flower of the Day, or Lady Plymouth Geraniums, their light tints contrasting with the brilliant orange and scarlet of the Sumach Rhus, large and small. Almost black are the curled Perilla leaves, and quite white the tender sprays of Variegated Balm; the fashionable brown comes from off yon tall Poplar tree that is slowly dying; and the Virginian Creeper produces the newer shade the French call "*Bismarck en colère.*" A stiff Hart's-tongue supplies the verdant green, and light fronds of Maiden-hair add gracefulness to the group; stiff and straight are the branches of green and white Periwinkle; the Amaranthus yields a melancholy red, while in the striped Iresine is seen the colour of Bordeaux wine; but between these two the ragged Cineraria maritima looks light and downy. Then a few of the sere yellowed leaves of Laburnum, all speckled as they are, a branch of snowy Gnaphalium near the spray of purple Beech, the shaded Liquidambar imberbe, and the pure crimson of the long narrow Cockscomb leaf, need only the shiny Ice plant, a dark olive Camellia or Myrtle leaf, with a spike or two of Juniper and Mountain Heather to complete as bright a cluster as ever wax lights illumined, though not one flower or berry rises from out our autumn bouquet. And so we find that e'en in withering leaves "a thing of beauty is a joy for ever;" and in arranging them remember that, at all seasons—

> "It is pleasant to note all plants, from the Rush to the spreading Cedar;
> From the giant king of Palms to the Lichen that staineth its stem."

Ariel, in *Gardener's Chronicle*, Nov. 2.

SEA GULLS.—Along our coasts, every summer, during the breeding season, thousands of harmless sea-birds are shot. The fellows who murder them are too clumsy to bag a cormorant, a diver, a scoter, or even a willock who can duck the flash. But the poor honest gull, who follows up the boat, in the hope of the leavings of the luncheon, as a robin might do on land, or a tern who hovers over them with innocent surprise, wondering what they are and mean—they, the most harmless and the most useful of sea-birds, are the special game of cockneys—for there are cockneys elsewhere than in London. The gull is the scavenger of the sea. He does his little best to ward off cholera and typhus from every foul ill-drained harbour. He ought to be preserved—if parliaments were parliaments—as religiously as vultures are in the tropics; and the fool who shoots a gull ought to be fined a pound.—*Fraser's Magazine* for November.

MONSTER EEL.—On Tuesday an eel of immense size was shown at Mr. Culling's, fishmonger, of Downham Market, which was taken out of the river Ouze, near Denver sluice. It measured in length 5ft. 8in., girth 17¼in., and weighed 36lb. (28lb. after being cleansed). Yarrell, in his "British Fishes" mentions having seen the skins of two at Cambridge which together weighed 50lb. (one 27lb. and the other 23lb.), which were taken within a few miles of the spot where this was captured. The party who secured it left for Cambridge with their prize, and obtained at Ely upwards of £3 by showing it. Ely is said to have obtained its name from rents in the isle being paid in eels. The lords of the manors in the isle were annually entitled to upwards of 100,000 eels—not, we presume, of this size.—*Times.*

Remarks, Queries, &c.

(*Under this head we shall be happy to insert original Remarks, Queries, &c.*)

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.—The Sixteenth Annual Meeting was held at Burlington, Vermont, commencing on Wednesday, August 21, and continuing until Monday night, August 26, 1867. The following papers were read in the Natural History Section:—

First Day.

"The Distribution of Precious Metals in the United States," by Col. Chas. Whittlesey.

Second Day.

"The Geological Relations of the Mastodon and Fossil Elephant of North America," by Prof. James Hall. "Considerations drawn from the Study of the Orthoptera of North America," by Samuel H. Scudder. "Traces of Ancient Glaciers in the White Mountains," by G. L. Vose. "The Origin of the so-called Lignilites or Epsomites," by Prof. O. C. Marsh. "The Geographical Distribution of the Sediments and the Fossils of the Hamilton, Portage, and Chemung Groups of New York," by Prof. James Hall. "The Distribution of Limnæa Megasoma and Cognate Genera," by L. E. Chittenden.

Third Day.

"Tellurium a Metal," by Prof. L. Bradley. "Upon some remarkable Fossil Fishes obtained by Rev. H. Herzer from the Devonian Rocks at Delaware, Ohio," by Professor J. S. Newberry. "The Fossil Insects of North America," by S. H. Scudder. "The Winooski Marbles of Colchester, Vt.," by Prof. C. H. Hitchcock. "The Zoological Affinities of the Tabulate Corals," by Prof. A. E. Verrill. "The Coal Measures of Illinois," by Prof. A. H. Worthen. "New Points in the Geology of Nova Scotia and New Brunswick," by Prof. J. W. Dawson.

Fourth Day.

"On some New Fossil Sponges from the Lower Silurian," by Prof. O. C. Marsh. "On the occurrence of Fossil Sponges in the successive Groups of the Palæozoic Series," by Professor James Hall. "The American Beaver," by Lewis H. Morgan. "The Distortion and Metamorphosis of Pebbles in Conglomerates," by C. H. Hitchcock.

Fifth Day.

"On some Fossil Reptiles and Fishes from the Carboniferous Strata of Ohio, Kentucky, and Illinois," by Prof. J. S. Newberry. "Cotta's Law of the Earth's Development," by R. W. Raymond. "On Mountain Masses of Iron Ore in the United States," by Col. Charles Whittlesey. "On the Lower Silurian Brown Hematite Beds of America," by B. S. Lyman. "Explanations of the Geological Map of Maine," by Prof. C. H. Hitchcock. "On the Geographical Distribution of Radiates on the West Coast of America," by Prof. A. E. Verrill. "Considerations relating to the Climate of the Glacial Epoch in North America," by Prof. Edward Hungerford. "Depression of the Sea during the Glacial period," by Col. Chas. Whittlesey. "Ripton Sea Beaches," by Prof. Edward Hungerford.

"On the Cretaceous and Tertiary Flora of North America," by Prof. J. S. Newberry. "On certain Effects produced upon Fossils by Weathering," by Prof. O. C. Marsh. "Geology of Vermont," by Prof. C. H. Hitchcock. "The Insect Fauna of the Summit of Mount Washington as compared with that of Labrador," by Dr. A. S. Packard, jun. "Remarks on the Ichthyological Fauna of Lake Champlain," by F. W. Putnam. "The Embryology of Libellula (Diplax?), with notes on the Morphology of Insects, and the Classification of the Neuroptera," by Dr. A. S. Packard, jun. "On the Flowering of Plants," by James Hyatt.—From *American Naturalist*, October.

THE KESTREL AND SPARROWHAWK. — In an extract from the *Times* on page 317 of this paper, the writer classes the kestrel with the sparrowhawk, and says that if they were allowed to increase he fears the farmers' chickens and ducklings would be heavy sufferers. Now it is a great mistake to think that the kestrel does anything like as much harm as the sparrowhawk. The sparrowhawk is well known to prey greatly on young poultry and game; whilst, on the other hand, the kestrel lives almost entirely on mice, which are the farmers' greatest enemies. Your correspondent "R. W. B.," on page 169 of the NATURALIST'S NOTE BOOK, states that in the year 1866 he found a chicken in a kestrel's nest; but this is quite an exception to the rule. I myself have examined more than one nest daily, for the purpose of finding out what they feed their young on. I have taken as many as a dozen mice and small rats from a nest in one day. During the whole time of incubation I have not found more than two or three small birds of any kind. I hope that what I have said may go in some way to prevent the innocent kestrel from suffering the penalty due to the rapacious sparrowhawk.

Mavisbush House. J. D. S. W.

GROWTH OF FERNS FROM SPORES.—I have been desirous of observing, by means of the microscope, the growth of ferns from spores, and have adopted the plan of scattering the spores on a piece of sandstone which stands in water under a bell glass; but although they germinate quickly, and go on well for a time, the prothallium does not attain its complete growth, so that I have been unable to study the antheridia and archegonia. My sandstone is placed in a cold room where it gets very little sun, and the spores have been germinating for more than two months; perhaps this is too short a time in which to give them up, but I am the more discouraged because they have scarcely made such quick progress as on another occasion when I tried the same experiment, and when they certainly stopped growing before they attained their full development. I may add that I tried cinders, as recommended in your number of last July, but that my spores did not sprout at all upon them. If any of your readers who have studied the growth of ferns scientifically would give me a few hints how to proceed I should be greatly obliged. I am also desirous of ascertaining what book gives the best account of the liverworts, and shall be greatly obliged for any information on that head.

Windermere, Nov. 10, 1867. T.

THE CHELIFER.—I take the liberty of writing to ask if you could give me any account of the Chelifer, or Chilifer, where found, &c.? THOS. S. GUYESS.

Speen Hill, Newberry, Nov. 12, 1867.

[The Book Scorpion (Chélifer Wideri) belongs to the class *Arachnida*. The Rev. J. G. Wood gives the following account of it in his popular Natural History:—"The Chelifer, a little arachnid very much resembling a tiny scorpion without a tail. The body is flattened, and the palpi are much elongated and furnished with a regular claw at the end like that of a true scorpion. The Chelifer is an active little being, running with much speed, and directing its course backward, forward, or sideways with equal ease. It lives in dark places in houses, between books in libraries, and similar localities, preferring however those that are rather damp. It does no harm however to the books, but rather confers a favour on their owner, feeding on woodlice, mites, and other beings that work sad mischief in the library. Its general colour is brownish-red, and it is remarkable that the palpi are twice as long as the whole body. This, as well as an allied genus called Obisium, is found in England. The two genera can be easily distinguished by the cephalathorax—that of Chelifer being parted by a cross groove, and that of Obisium being entire.]

THE HOUSE-SPARROW.—On page 61 of the NATURALIST'S NOTE BOOK, a writer to the *Field* supposes that the benefits conferred by the common sparrow outweigh tenfold the mischief it does in consuming corn and other grain. I think there can be no doubt but that this is far too bold an assertion. In some places it certainly does much more good than harm, but in others it does much more harm than good. As a rule I think the house-sparrow may be considered a friend to the *gardener*, but an enemy to the *farmer*. Where grain and insect food are equally abundant, the common sparrow almost invariably chooses the former to the entire neglect of the latter. The same writer also states that he has found them valuable assistants in clearing his gooseberry and currant trees of caterpillars. But a year or two ago my own gooseberries and currants were nearly all destroyed by small green caterpillars—the shrubs being completely covered with them—and although sparrows flocked in the neighbourhood the insects were left untouched, whilst stacks of grain kept close by suffered considerable damage. A writer to the *Times* (page 317 of NATURALIST'S NOTE BOOK) speaking of the house-sparrow says—"when too numerous, and when surrounded by corn, his habits become almost entirely *graminivorous*." I think the most just conclusion to be arrived at with regard to the common sparrow is, that the evil it does is counterbalanced by the good; and that an indiscriminate slaughter of this bird would be fraught with very serious consequences. This has been already proved by many in various parts of the kingdom. R. W. B.

BIRDS AND THEIR YOUNG.—Having tried the experiment of changing the young of different birds in order to discover their powers of discerning their own from those of strangers, I give the following:—In the spring of 1865 I took an unfledged hedgesparrow and changed it for a young brown linnet of the same size, placing the sparrow in the linnet's nest. On visiting the nest next morning I found that each of the mother birds had discovered the little strangers and shown them no mercy, both of which were lying dead at the bottom of the nests. Last year I put an unfledged jackdaw into the nest of a blackbird, in place of her only young one. Although it was nearly twice the size of the young blackbird the old birds did not perceive the difference, but treated it with the greatest care, and used to make a great uproar when any one approached the nest. The jackdaw throve very well for several days, during which time its foster parents fed it on worms and grubs. One day on examining the nest I found the poor thing quite dead, and being interested in the case I endeavoured to discover the cause, and found that the old birds had treated their young charge to a feast of ivy-berries, which no doubt had poisoned it.

Mavisbush House. J. D. S. W.

RAIN WATER.—"Pure cold water is the best drink, when it can be received without the dust and other properties, with which it often becomes mixed. As it falls upon the roofs of houses it is soft and pure. 'Hard water,' as it is called, is unwholesome. When no other water can be obtained, as is often the case in cities, 'hard water' may be filtered or distilled, and in this way be rendered perfectly pure and fit for drink."

In the above paragraph, taken from the *Journal of Health* for March, 1855, we are told that *rain water* is preferable to *spring or hard water* for drinking purposes. Is this true? R. W. B.

ORNITHOLOGY OF BERKS AND BUCKS.—Being engaged in writing a history of the birds of these two counties, I shall be much obliged to any gentlemen who are cognisant of facts connected with the birds of Berks and Bucks, if they will forward notes, anecdotes, &c., to me, at "Messrs. Ingalton and Drake's, High Street, Eton, Bucks (by whom subscribers' names are received).

ALEXANDER CLARK-KENNEDY.

NATURAL HISTORY OF NEW ZEALAND.—As I am contemplating returning to New Zealand I should feel obliged if you or any of the readers of the NATURALIST'S NOTE BOOK would be kind enough to recommend to me any book or books (elementary) on the entomology, conchology, and fish of the above colony.

JAS. R. BURNSIDE.

FROGS AND THEIR FOOD.—Frogs when in a tadpole condition feed on that very common green weed which always collects on the sides of any vessel that has had water in it some time. W. R. B. GYRINUS.

THE COMMON MOUSE.—The common mouse has a natural appetite for bacon; the common field-mouse eats meat raw or cooked. J. R. B.

SENSITIVE PLANTS.—Can you or any of your readers inform me which is the best way to raise sensitive plants, the best time to sow them, &c.? A. de H.

STATE OF THE WEATHER NEAR LONDON.

Oct. and Nov.	Moon's Age.	BAROMETER.		TEMPERATURE.					Wind	Rain.	REMARKS.
				Of the Air.			of the Earth				
		Max.	Min.	Max	Min	Mean	1 foot deep	2 feet deep			
Thurs. 17	20	29.705	29.686	62	41	51.5	50	52	S.	.04	Clear; fine; masses of white clouds; rain: clear.
Friday 18	21	29.719	29.665	61	36	48.5	50	52	S.W.	.08	Clear; clear and fine; rain; clear at night.
Satur. 19	22	29.679	29.648	58	32	45.0	50	52	S.W.	.01	Overcast; fine; overcast; low fog; clear.
Sunday 20	☾	29.968	29.812	60	30	45.0	54	53	S.	.00	Foggy; very heavy dew; clear and very fine; clear.
Mon. 21	24	30.040	30.101	58	31	44·5	53	53	S.W.	.00	Overcast; cloudy; overcast at night.
Tues. 22	25	30.177	30.128	62	50	56.0	53	53	S.	.00	Overcast; cloudy; fine; clear at night.
Wed. 23	26	30.044	29.859	57	45	51.0	53	53	S.E.	.00	Overcast & damp; clear & very fine; bright sun; overcast.
Thurs. 24	27	29.942	29.785	61	41	51.0	55	53	S.W.	.00	Overcast; very mild; very fine; clear; low fog.
Friday 25	28	30.130	30.085	62	34	48.0	55	53	E.	.00	Overcast; fine; cloudy and fine.
Satur. 26	29	30.082	29.938	62	45	53.5	51	53	S.	.00	Clear; low fog; clear and fine; clear.
Sunday 27	●	29.502	29.351	51	29	40.0	52	52	N.W.	.17	Overcast; boisterous; very heavy rain; clear and cold.
Mon. 28	1	29.924	29.762	55	30	42.5	51	51	N.W.	.02	Clear; hoar frost; clear and fine; clear and frosty.
Tues. 29	2	29.999	29.738	55	47	51.0	51	51	S.W.	.01	Rain; cloudy and boisterous; cloudy; overcast.
Wed. 30	3	29.982	29.874	54	47	50.5	51	51	S.W.	.06	Overcast and damp; overcast; rain at night.
Thurs. 31	4	29.901	29.877	57	43	50.0	54	52	.W.	.06	Overcast and mild; cloudy and fine; overcast.
Friday 1	5	30.010	29.837	65	32	48.5	54	52	W.	.00	Overcast; fine; clear at night.
Satur. 2	6	30.469	30.227	52	24	38.0	51	52	N.	.00	Clear; bright sunshine; clear and frosty.
Sunday 3	7	30.845	30.396	51	32	41.5	50	50	W.	.00	Heavy fog; clear; overcast at night.
Mon. 4	☽	30.190	30.219	53	33	43.0	51	50	W.	.00	Overcast and cold; overcast; fine; overcast.
Tues. 5	9	30.252	30.222	48	24	36.0	49	50	N.E.	.00	Clear and fine; masses of white clouds; clear and frosty.
Wed. 6	10	30.425	30.366	49	25	37.0	48	49	N.E.	.00	Foggy; hoar frost; cloudy; clear and frosty at night.
Thurs. 7	11	30.494	30.471	52	24	38.0	47	48	W.	.00	Heavy fog; very clear, with bright sun; low fog; frosty.
Friday 8	12	30.516	30.493	54	28	41.0	46	47	W.	.00	Low fog; hoar frost; very clear; clear and frosty.
Satur. 9	13	30.518	30.492	49	37	43.0	48	47	W.	.00	Foggy; overcast; densely overcast.
Sunday 10	14	30.471	30.395	51	30	40.5	48	47	N.E.	.00	Overcast; overcast and damp; overcast; mild.
Mon. 11	15	30.309	30.180	41	26	33.5	47	47	W.	.00	Overcast; very mild; heavy fog; foggy at night.
Tues. 12	○	30.277	30.084	44	36	40.0	47	47	N.E.	.00	Overcast and damp; foggy; overcast at night.
Wed. 13	17	30.007	29.852	50	26	38.0	48	47	W.	.00	Overcast; mild; overcast and damp; clear and frosty.
Thurs. 14	18	29.624	29.537	56	40	48.0	49	47	S.	.08	Rain; overcast, showery; overcast and mild.
Friday 15	19	29.603	29.551	61	44	51.5	50	48	S.E.	.00	Foggy, very mild; overcast; fine but overcast.
Satar. 16	20	29.668	29.563	48	38	43.0	48	47	E.	.00	Overcast, boisterous and cold; boisterous, clear and cold.
Sunday 17	21	30.035	29.778	48	30	39.0	47	47	N.E.	.00	Overcast and boisterous; overcast, cold; cloudy.
Mon. 18	☽	30.243	30.162	43	39	41.0	48	47	N.	.00	Overcast, mild; overcast; fine, but overcast.
Tues. 19	23	30.247	30.230	49	26	37.5	46	47	N.W.	.00	Overcast and mild; overcast; clear and frosty.
Wed. 20	24	30.347	30.298	41	36	38.5	45	46	N.	.00	Clear, hoar frost; overcast; overcast and cold.

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